NOVEMBER 20, 1985 VOLUME 19, NUMBER 46A

- RIVALS BEGIN LINKING TO IBM PC
- UNLOCKING THE MICRO BUYING DILEMMA
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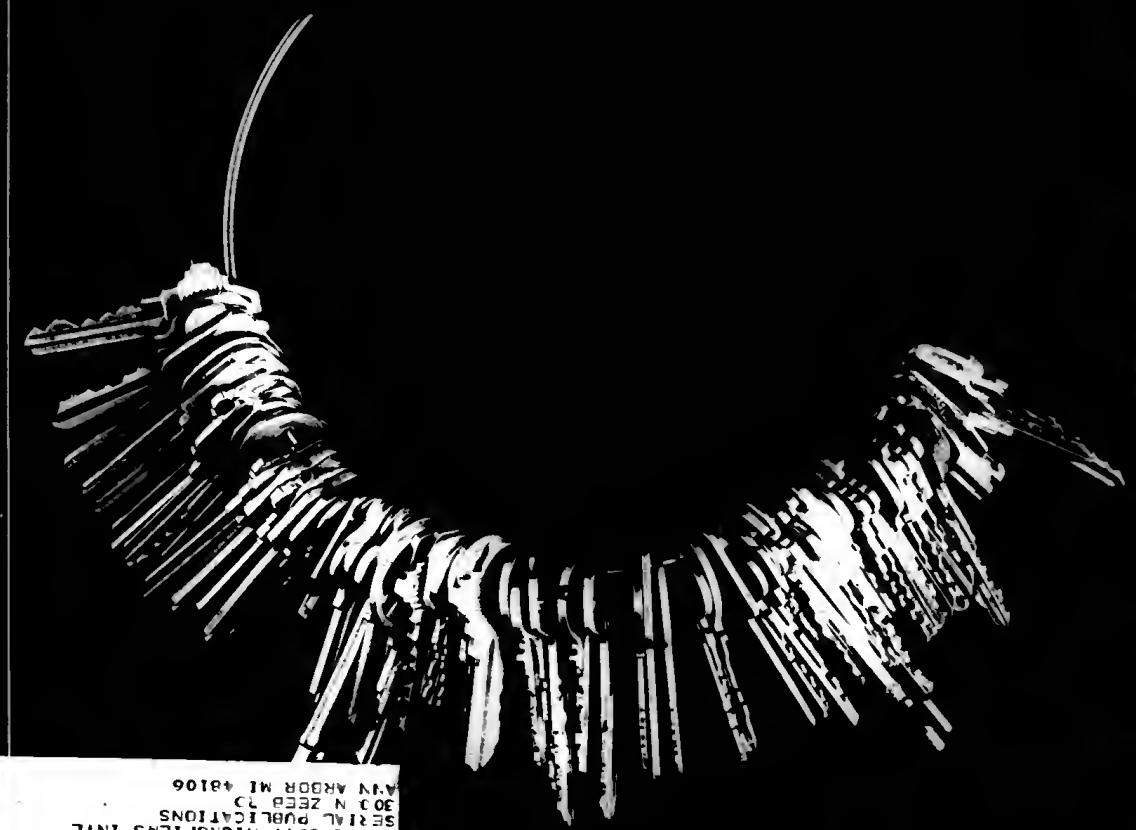

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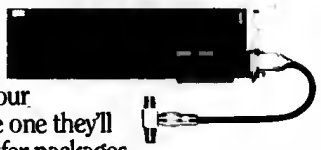

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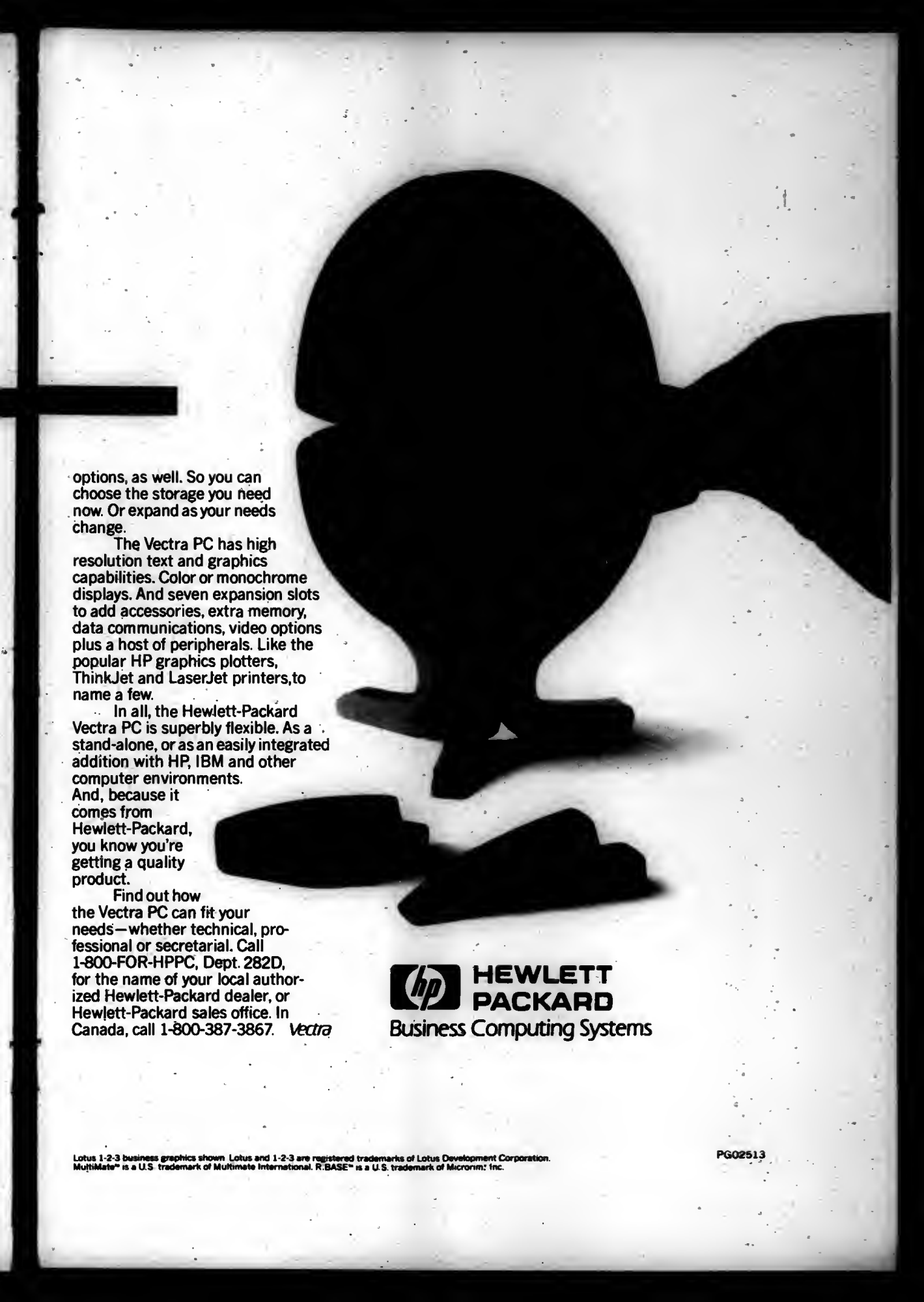

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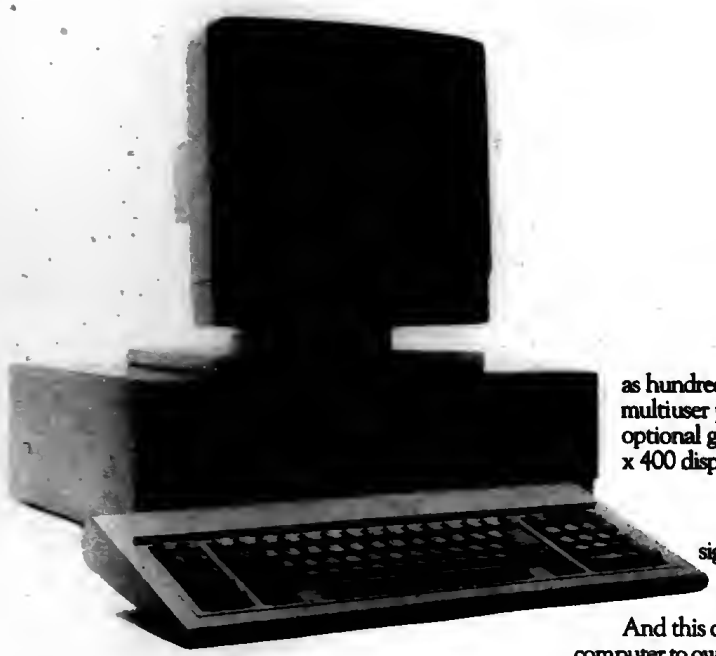

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30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User _____

Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
39 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
69 Consulting Mgmt
75 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
99 Other _____

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Supermnis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

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Editorial Insider

Sparking a Revolution

The question of whether IBM's recent token-ring local-area network announcement is too little, too late won't really matter in the long run. It may be true that the users who decided to buy into IBM's previously announced PC network may feel burned by Big Blue. And a vendor like Sytek Corp. may feel it has been sent up the river without a paddle. But even though the product is neither revolutionary nor the ultimate all-in-one panacea, IBM's announcement is bound to begin a revolution in the local-area network industry.

Although the product itself was greeted with an almost universal lack of enthusiasm, sparks started flying immediately. As soon as IBM's press announcement ended, Texas Instruments, Inc. announced a chip set to support the new product. And a whole third-party industry is expected to start up around this new communications system. IBM's strategy of opening up the system is designed to allow independent network operators to support and fill out the product line — a scheme used by IBM to market its PC.

At the very least, IBM's announcement paves the way for connecting bigger systems and the network's open design is expected to initiate a surge of local-area network purchases. In addition, most of the major computer vendors admitted they would probably offer bridges to the network. The apparent exception is Digital Equipment Corp., marketer of Ethernet, that has reportedly maintained the new network is not an industry standard.

It may be a bitter yet familiar pill to swallow. Despite its drawbacks, IBM's entry into the local-area network market has added credibility and legitimized the industry as a whole. Ethernet struggled for years before gaining acceptance among users and vendors, while this new system is hailed as a de facto standard before it's even out the door.

But it won't be an easy path to follow. Although IBM is claiming to offer an open system, connection is difficult at this point because IBM has not disclosed plans for integrating the network with mini and mainframe systems. For the foreseeable future, vendors and, of course, users will still be subject to IBM's whims as to how or when this connection will come about. The seemingly ever present reality of life in the computer industry is not whether but how to adopt to IBM. Vendors would only be doing their customers a disservice and, in the long run, hurt themselves by not providing an IBM connectivity option. It has been a long, hard lesson, but the industry seems to have learned that the only way to beat IBM is to at least play the same game.

Escaping the Doldrums

By Timothy J. Caffrey

The recent announcement of IBM's third-quarter earnings (down 7%) was accompanied by an oft echoed explanation from John Akers, IBM chief executive officer. In sum, Akers attributed the continued slowdown to the strength of the U.S. dollar, the softness of the U.S. economy and slower overall capital spending. The same unhappy chorus has been sung by most vendors reporting less than stellar sales and earnings. While these broad problems undoubtedly describe the surface of the industry doldrums, they gloss over what appears to be a fundamental change in demand psychology. There are exceptions, but most buyers for large organizations find it difficult to produce a compelling reason to buy computers at the same rate as in recent years.

There are probably several reasons for this hesitance. The most commonly heard are those cited above. When overall economic growth slows, as it has recently, large organizations tighten their belts and rein in plans for new acquisitions. Other reasons are more subtle but equally powerful. For example, while personal computers were touted as productivity tools for the masses, most purchases served two narrowly defined audiences. The first was the group who understood computers, knew their applications (primarily spreadsheet) and recognized them as a way around the management information systems processing monopoly. This vocal minority pushed the machine to the limit, posed as the typical user success story and served as the catalyst for astronomical growth projections.

The second audience saw the personal computer as a symbol of success. The search for excellence was translated as the search for the most powerful desktop computer. Offices across the country were soon adorned with the latest hardware and software. It took little time for the market to meet these demands.

When it came time to justify personal computers, however, new orders slowed appreciably. The reason was straightforward. When money became tighter, buyers were hard pressed to justify further acquisitions. Evidence of promised productivity gains was either nonexistent or difficult to quantify. The acquisition cycle lengthened, the spotlight shifted to departmental processors and justification became even more demanding. The result was demand for low-end processors and peripherals slackened and slowdown and shakeout grabbed headlines.

Given the change in buyer sophistication and expectations, it is difficult to believe the slowdown will be short lived. Some argue that IBM's unhappy chorus may be a market anthem for some time. That assessment is perhaps too grim.

While familiar products have failed to deliver on their promise of productivity gains, new demand factors are emerging. The head of MIS at one of the nation's largest utilities commented recently that the need for quality software and systems engineers far outstripped current supply. Looking to the future, he saw demand expanding and supply contracting. His response has been to focus on the potential for expert systems to meet a part of his long-range requirements.

Broad demographic trends support this expectation. The maturation of the baby boomers will place a significantly greater burden on succeeding generations. Individual productivity will have to increase significantly to sustain and expand current levels of production. This scenario appears incontrovertible. The challenge is to develop products that begin to satisfy this emerging demand in a meaningful way.

You get the sense that general-purpose processors (whether large or small) and generic productivity solutions no longer fit the bill. Demand-specific applications will drive the industry forward. Expert systems are a good current example of this need for market specificity. Defined as programs that solve difficult, highly specialized problems normally requiring human expertise, this subset of artificial intelligence research has begun to produce significant commercial fruit.

Does this mean expert systems are the only viable market and all expert systems will meet with unqualified success? Certainly not. The discussion of expert systems merely illustrates a conviction that new, compelling demand will emerge when products address specific business needs. Expert systems augment the expertise of specific professions. Development tools allow individuals or departments to build customized applications. Creative interface devices reach new user populations. These examples hardly exhaust the opportunities. But we'll remain in the doldrums as long as supply is out of touch with demand.

Caffrey is director, strategies for microcomputers and office systems, for International Data Corp. in Framingham, Mass.

dB
BY RICH TENNANT
IT'S GOOD dB. WHILE GONNA BE HERE ALL NIGHT TRYING TO FIGURE THIS OUT.
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Q&A

Aaron Goldberg, director, micro advisory services at International Data Corp., a market research firm in Framingham, Mass., is known for his sometimes irreverent, always insightful views of the microcomputer industry. Goldberg shared some of his opinions in a recent interview with Computerworld Focus.

Do you see any major advances in microcomputer technology that will make a big splash in the marketplace?

Don't expect to see any major revelations in the fundamental hardware itself. We're moving into an Intel 80286-based generation of products that provides a faster, more efficient engine to run software. The biggest impact on users will come from soon being able to run large systems applications on [IBM] PCs.

If you're planning on using and managing this equipment, keep an eye on quality. Today, we're seeing hard disk drives for PCs priced at anywhere from $350 to $900 for a 10M-byte system. The $350 drive, however, probably failed testing routines, was returned, tweaked a bit, passed the tests and then unloaded on the market, usually spelling trouble for a buyer who says, 'Gee, that's a 300% difference in cost from the $900 drive.' A more intelligent way is to spread the actual cost over a period of time. The $600 price difference depreciated over five years is about 10 cents a day. In a market where there will be a lot of price cutting, you'll have to concentrate on value, not increments.

The real changes in the micro market are going to come from the software side. We've just seen the first of two new application products, Paradox (Ansa Software Corp.) and Q&A (Symantek Corp.), that are going to be the first in a series of programs to use artificial intelligence to improve software for the PC.

These programs will run on IBM Personal Computers and IBM Personal Computer ATs, but will need more memory. Will the vendors of add-on boards play a role in increasing the use of this new generation of software?

First of all, I think we're going to see the AT become a standard. I can see floppy disk-based AT prices in the $2,500 range by first quarter 1986. Sales will go up fast. The AT's eclipse of the PC will stimulate the AT add-on market, and these boards will go hand in hand with increasing sales of the new software.

Do you have any idea about IBM's next product?

I hate to give it a name, and I certainly don't want to name it PC2 after IBM's formal position on it. If I were IBM, I'd be laughing at analysts (unfortunately, I fit into that group at times) who thought IBM was going to come out and undercut their own price with a new technology PC product. That makes no sense because they'd be leaving money on the table and hurting their initial product.

What makes more sense is IBM's coming out with another 80286-based product before the 80386 is available. That's not definite. They might go straight to the 386 to make a product that in any case will probably come out in the first quarter 1987.

My guess is it'll be a higher-end AT. Bringing out a lower-priced AT will only hurry the price erosion that's already occurring in the AT market. If IBM's smart, they'll bring out an AT with a higher clock speed. I see a much faster AT from IBM, with an 8-MHz or 10-MHz microprocessor, a standard hard disk so IBM can capture some hard disk business that they're losing now to dealers.

Perhaps they'll also add an extended graphics adapter, maybe some other tricks and all of a sudden they have another 286 product, a super AT. It's also going to cost more, up in the $5,000 to $6,000 range, unless the AT prices further their downward migration.

Where does MIS fit into all of this? Will its role change with micro users?

MIS will become less of a back-room score-keeping function and more of an in-house service facility. PCs are one of the first harbingers of this change in MIS. It will really start to happen when all these machines are connected together. It makes sense. If I'm going to leverage and make good use of the resources in my organization, I have to make good use of PCs; therefore, I have to become involved with them, not in terms of running them and writing software, but in terms of support and making sure they're used as a resource.

Have you been following L.U. 6.2?

From a competitive standpoint, IBM; Compaq Computer Corp.; Digital Equipment Corp.; Wang Laboratories, Inc.; and others — the big players with money — realize the personal computer market is still too easy to enter from the low end. If these vendors are going to be successful and control the market, they have to raise the entry barrier. The way to do it is in software, which is the big weakness for all these start-up companies that have very little software expertise.

If you make the PC a product that not only has to satisfy me with my Lotus [Development Corp.] 1-2-3 and single-tasking DOS, but a machine that must also work within a DCA/DIA [document content architecture/document interchange architecture] kind of environment and must have a set of circuitry that supports a P.U. 2.1, Snads [systems network architecture distribution services] or L.U. 6.2 environment, it becomes a bit harder for other companies to pay the entrance fee. For users, L.U. 6.2 is a beneficial advance; in a marketing sense, it is a weapon.

What about the future of the PC?

The PC will decline and fall. It's a four-year-old product. IBM will not spell the death of the PC, however. That'll happen when major applications no longer run on it or don't run satisfactorily. The same thing will happen to the PC that happened to the Apple II [Apple Computer Corp.] in the business environment. Lotus came up with its great 1-2-3 package that only ran on the PC. The same thing will happen with the AT. Lotus might come up with a 4-5-6 product, or it might be somebody else's package. Once something big in software hits the AT, the others will follow.

— Stan Kolodziej

Manager's Corner

By Jim Young

"The more things change, the more they stay the same." The so-called micro revolution is not all that dissimilar to the previous minicomputer revolution. Comparing these two phenomena gives a feeling of deja vu, as once again organizations deal with the integration of new devices into business applications.

During the advent of the mini, computer vendors went into a feeding frenzy of selling as they called on non-data processing customers. Excited by what they heard, capable users shed their Walter Mitty roles and became assertive lobbyists for particular automation strategies. The lack of DP responsiveness to their needs caused them to push even harder for independence (distributing the processing to them). DP fought valiantly for its honor as whole systems were evaluated for potential spin-off to some minicomputer environment. But with a multiyear development backlog and a growing maintenance load, it was a losing cause and DP won out.

Today's microprocessing systems are repeating this trend on a reduced but much broader scale. In retrospect, the application systems at issue with minicomputers are sizable and self-contained and therefore easy to identify and control. Personal computers are cost-justified for more mundane and isolated uses. It is harder to see where the specific needs or wants are within the company landscape. In many cases, however, DP has installed control programs that, with some adjustment and addition, can make the integration of microprocessors and personal computers in companies an evolutionary and popular process and not the donnybrook of years past.

The starting point is detecting the need. This can be everything from fielding requests to instituting an outreach program that finds high payback areas within the company. This is a different approach, which conveys a responsive attitude. Additionally, DP's responsibility to recommend all hardware and software puts it in a position to help many users acquire personalized solutions. A client reference list of successful applications goes a long way to show customers they have come to the right place. Other programs in place that can help this process are the standardization of all equipment, training programs, policies on integration of application plus control of information and support programs such as equipment repair, diagnosis, help desks and the centralized support of user groups, newsletters and so on. This was not the climate in the minicomputer days.

As personal computer use evolves, DP's biggest problem will be finding the high-payback applications. This may entail identifying the outlying, previously unaddressed applications and exercising leadership in their automation. This is no small challenge because of the obscurity and differences of the remaining, untouched needs. There is also a new and burgeoning opportunity for micros to be used within mainstream systems. We may have been fooled by the term personal in personal computers. It is not necessary that these sophisticated devices be restricted to doing Lotus Development Corp. applications or stand-alone word processing. They do not have to apply to purely isolated and nontraditional applications.

Progressive DP shops are already designing the use of these devices into their existing applications. It is possible that they can perform part of a particular application (such as the data collection) or fulfill the analytical requirements of a much larger system. They may front end a large data base machine or interface with multiple applications. In larger applications, the mainframe can be reserved for the integration of data and the actual number crunching. This is our old friend, distributed processing, but it is now done using cheaper, smarter tools. If intelligently, top-down designed into an application, it can reduce costs, increase function and improve usability.

No! a little of this opportunity will be presented by the advancements of technology and the work of third-party software houses. In addition to dealing with in-house development on microcomputers, software is available that is already integrated and takes advantage of microcomputers for selected applications. Sophisticated accounting, personnel and sales applications now available run on the mainframe but use personal computers to interface, analyze and perform other necessary features in a way that minimizes mainframe load and production interference and gives maximum access and function to the involved user.

Ultimately, as the hardware of the future improves with dazzling rapidity, certain software applications can reside exclusively on personal computers. Even today, astonishingly complex software

(Continued on Page 11)

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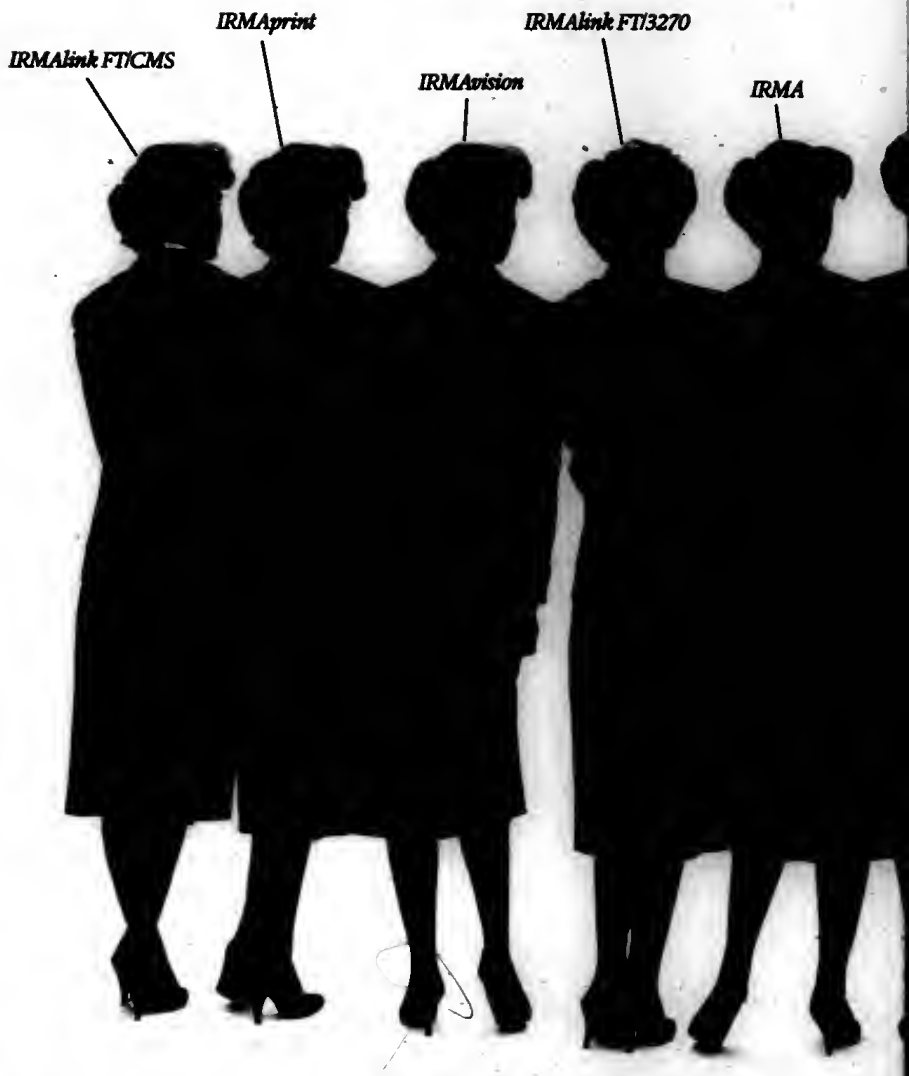

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In the News

AT&T Takes Aim At 3270 Mart

AT&T has apparently decided to try and break out of its also-ran position in the 3270 terminal emulation market. After garnering an unspectacular 5.7% of the 3270 terminal market in 1984, AT&T has introduced three new families of terminals and a cluster controller, which the company is betting will put it on track to becoming a major force in the IBM-dominated 3270 industry.

AT&T's strategy will be to market terminals and controller in clustered configurations of eight and 16 terminals, priced from $41,000 to $59,000, according to Ken Kamka, responsible for product planning and management of AT&T's synchronous product line.

Produced by AT&T Teletype, the Skokie, Ill., arm of AT&T's Data Terminal Equipment Division, the new 3270 equipment will be marketed, Kamka said, without the usual tag of being 3270-compatible. Instead, the marketing strategy will promote the products as "beyond what's now available from IBM and others."

The lower-priced configuration will consist of six of the new monochrome terminals, two printers and the 16-port (expandable to 32 ports) 6500 multifunction communications controller. The high-end configuration, termed the multitasking system by AT&T, will consist of the 6500 controller, eight monochrome terminals, six color terminals and two color printers.

Through the controller, users will have the ability to attach to as many as three synchronous hosts, depending on the protocol, Kamka explained. Three bisynchronous lines can be attached to this control unit or to two Systems Network Architecture lines and one bisynchronous lines. There is also the ability for one of those synchronous connections to support X.25 protocol. Kamka added that AT&T will also be offering a module unit that "slides into the controller" and allows the controller to attach to an asynchronous host or, alternately, allows one of the new AT&T 6500 series terminals to emulate a Digital Equipment Corp. VT220 terminal and talk with the asynchronous host.

AT&T's new 6500 family of terminals is constructed of three tiers. At the low end is the 6518, which, according to Kamka, is a basic monochrome display, equivalent to the IBM 3178 terminal. Up the scale, the 6528 monochrome and the 6529 color terminal are available in screen character formats of 27 by 132 and, according to Kamka, are able to perform two full-screen, concurrent host and terminal sessions. The 6538 monochrome and 6539 color terminals, referred to by AT&T as multitasking displays because of their windowing capabilities, make up the high-end terminals. Both models handle four separate and concurrent window sessions and, reportedly, allow a mixture of synchronous and/or asynchronous protocol sessions.

Kamka explained that the capability to switch among various host protocols will appeal to those Fortune 1000 corporations starting to do more business with other companies and coping with a variety of protocols.

Kamka said the company is also about to market a plug-in circuit card for IBM Personal Computers and AT&T's 6300 PC-compatible, enabling the PC to cable into the controller and on to the host, emulating a 3270 terminal. (AT&T can now plug its 6300 into 3270 emulation only through an awkward connection with its old line of terminals.)

AT&T has also announced a 6500 personal computer that Kamka described as analogous to the IBM 3270 PC. Although not scheduled for shipment until the third quarter 1986, the 6500 will be slated for those people who are 3270-oriented, but also want PC capability.

Kamka said AT&T is putting the tools in place to go after IBM, which currently retains about 60% of the 3270 terminal market (based on figures from International Data Corp., Framingham, Mass.). He added that the new terminals employ current ergonomic design and styling, a departure from the characteristic bulkiness of the 3270 terminals produced by Teletype in the past.

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The Best Things in Life Are Free

How times change. Free-Link, a generic micro-to-mainframe link from On-Line Software International, Inc. was introduced at Info '85 in New York in October, accompanied by a different kind of marketing strategy. The company is giving away the mainframe portion of Free-Link to data processing and management information systems managers at qualified IBM CICS sites.

The micro portion of Free-Link will be available to personal computer users for $495. The free software offer is scheduled to expire February 14, 1986.

After that time, the mainframe portion will cost $6,000 for the DOS version and $10,000 for the OS version.

In the News

IBM Previews Long Awaited Token Ring

A token portion of the long awaited token-ring network from IBM has finally been announced. The computers initially supported by the network include most of the IBM Personal Computer family: the PC, Portable PC, PC XT and PC AT. The missing siblings are the PCjr and the 3270 PC.

The IBM token-ring network will allow PC users to share files, applications and other resources at data transmission speeds of 4M bit/sec. In addition, the network features automatic error detection and the capability to bypass a failed station without interrupting service to other users. Of equal importance is that IBM is opening up the network to industry participation, according to Stephen B. Schwartz, vice-president and assistant group executive of IBM's Information and Communications Group, Telecommunications Products Organization.

"This will allow others to develop software applications and additional hardware to add more function to the network," Schwartz said. IBM has already offered early prototypes and specifications to several manufacturers whom IBM has said are interested in developing products for the network.

IBM also announced the extended specifications of the IBM Cabling System to include unshielded telephone twisted-pair wiring to connect devices around the ring. Up to 72 PCs can be connected using new or already installed unshielded telephone cable. Up to 260 PCs can be connected using data-grade cable.

Much of IBM's announcement was considered by industry cognoscenti to be full of sound and fury, possibly signifying nothing. That IBM will at some point extend the token ring to include departmental and mainframe computers is probable. When this will happen is anybody's guess, and IBM isn't talking.

Michael Bobrowicz, research analyst at the Gartner Group in Stamford, Conn., thought the announcement of the token-ring network was significant only because it had IBM's name on it. An important disadvantage, Bobrowicz explained, was the necessary memory requirement (from 128K bytes to 504K bytes) to put a personal computer on the local-area net if you want to use the mainframe System Network Architecture access package. Not all industry gurus, however, cast jaundiced eyes upon IBM's announcements. Michael Killen, president of Strategic, Inc., an industry research company, thinks the token-ring network is significant. "It's the first visible sign that IBM has made some progress implementing the token ring. I'm sure IBM's top management is elated that they finally have something to show for all their work." Killen also stated that all the other communications companies developing bridges, gateways, interfaces and other types of local-area nets now have some signpost for IBM's direction. "[These vendors] can now announce products that the marketplace will accept and believe in because everyone is working toward the same standard," Killen said.

Manager's Corner

(Continued From Page 6)

packages that run independently on microcomputers are available. Applications such as manufacturing resource planning, fixed assets and payroll all have competent micro versions that are appropriate for larger companies. Micro networking means that sizable departments can use these applications through multiple workstations. Local-area nets can further link together enclaves of single application micros. Function will eventually grow as these links permit broader and broader access.

These advances are shrinking the exclusive domain of mainframes. While many justified uses of the mainframe remain, much of its role will be usurped over time. To anticipate this trend, systems design must make more varied use of hardware alternatives and use contemporary solutions for the most cost-effective user-responsive results. By anticipating future hardware and software announcements, selections of microprocessors in the use of mainstream systems can only position departments to be flexible and receptive enough to take advantage of the new announcements.

It is said that those who do not learn from history are condemned to repeat it. Let's not return to the user/DP design battles where we argue over hardware and who owns it. DP can prevent this by pinpointing opportunities to use personal computers in mainstream business applications.

Young is MIS director and responsible for user technology at a major Massachusetts manufacturing firm. He has worked in the industry for 15 years.

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In the News

Micro Links Used at Most Basic Level

Though 90% of corporate computer users have microcomputers communicating interactively with the mainframe, most of the micros are simply acting as emulators of standard terminals and not taking advantage of the distributed intelligence offered by the personal computer. This finding is from a survey entitled *PC-Mainframe Systems in Practice*, from Xephon Technology Transfer, a consulting firm in Newbury, England. The survey suggested that very few corporate computer users are creating truly integrated PC-mainframe systems.

Emulation of standard IBM 3270 terminals was found to be the most common way of achieving a personal computer/host link. Despite IBM's reluctance to support asynchronous protocols, however, the Xephon survey also found that asynchronous/TTY connections are widely used by the IBM user base, "mainly because it's the closest thing to a universal standard for communications across public telephone networks," Ken Hough, Xephon's U.S. agent, explained.

Users in the survey evaluated three types of link products: the Irma add-on board from Digital Communications Associates, Norcross, Ga.; IBM's 3270 emulation products; and asynchronous connections requiring a modem.

According to the survey, users thought the Irma boards easy to use and reliable, but suffering from slow data transfer, lack of windowing capability and a high price. Users thought IBM's 3270 emulation products were strong because of IBM's service backing and straightforward connections, but lacked sufficient software, windowing and good graphics. Finally, the strengths of the asynchronous connections centered on low cost, ease of use and PC support, but suffered due to slow operation and poor data integrity.

Business Market To Upswing

The business/professional market for personal computers should experience a distinct upturn in 1986, according to *The Personal Computer Market*, a report issued by International Data Corp., a Framingham, Mass., market research firm. The report identified three major reasons for the turnaround: the continued influx of the Intel Corp. 80286-based micros, which should help convince users the older 8088-based computers are technically obsolete; the appearance of a landmark software program that will only run on 80286-based products (following previous examples such as Visicorp.'s Visicalc, written for the Apple Computer, Inc. Apple II and Lotus Development Corp.'s 1-2-3, written for the IBM PC); and an increase in time and number of applications typically done by the end user.

Site License Outcome Still Unclear

A sluggish microcomputer software market may begin to loosen the tight restrictions software vendors hold toward program copying. Though many of the software firms dropping copyright protection are smaller operations, the recent decision by Microsoft Corp. of Bellevue, Wash., to drop its copyright protection on its word for networks program is giving user organizations hope that some of the other industry leaders will follow suit.

"The economic climate is a major reason for the changing attitude toward copy protection," Dave Browning, director of vendor relations, Capital PC User Group, Inc., Gaithersburg, Md. "There is also increasing pressure from large corporate users who have established equity in a vendor's software product. These users expect the vendor to be a little more lenient when it comes to copy protection." The question will prove to be a continuing struggle between users and vendors with the outcome up for grabs.

Corrections

In the October issue of Computerworld Focus, *the company referred to as CCA is Computer Corporation of America, not Computer Communications Associates (Page 12).*

In the same issue, Bruce Poole's company, California Software, Inc. is located in Santa Monica, Calif., not Sherman Oaks, Calif.

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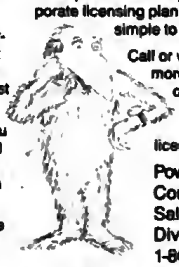

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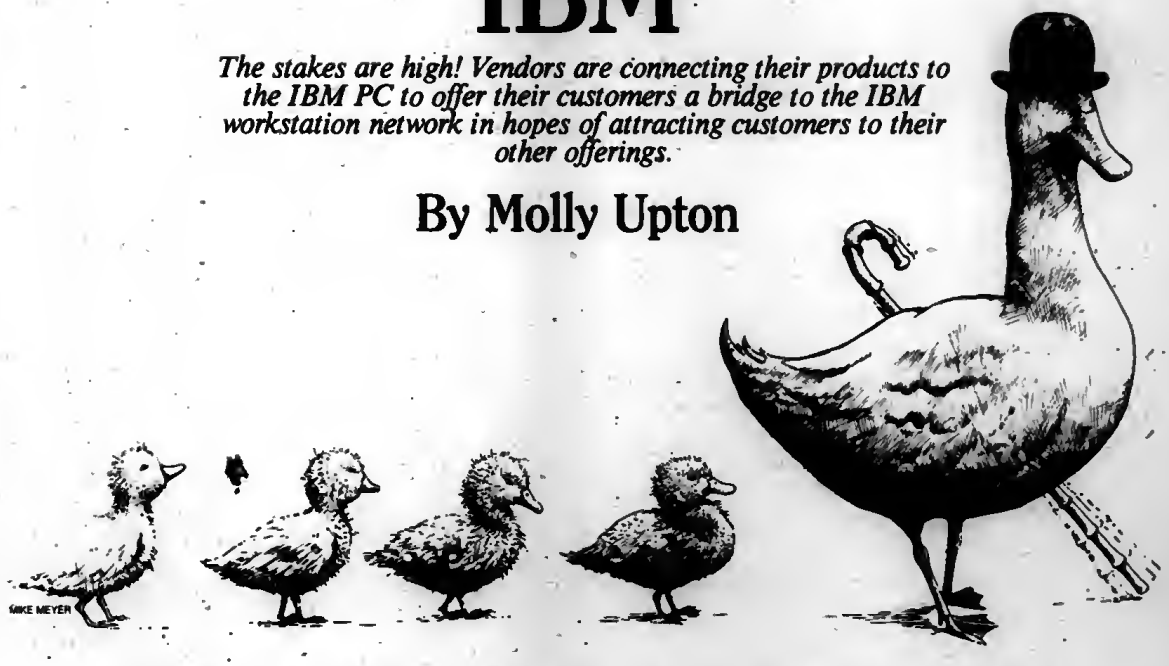
Vendors Line Up Behind IBM

The stakes are high! Vendors are connecting their products to the IBM PC to offer their customers a bridge to the IBM workstation network in hopes of attracting customers to their other offerings.

By Molly Upton



Several vendors of office automation systems are lining up behind IBM in order to expand their market shares by taking advantage of the installed base of IBM Personal Computers and compatibles.

What is the reality? At the beginning of 1985, the IBM PC had captured no less than 42.6% (1.1 million units) of U.S. personal computer shipments into the business/professional market, according to International Data Corp., Framingham, Mass. Desired applications for this group consist of management productivity applications — spreadsheet, word processing, financial modeling and personal data base/file maintenance.

The stakes are high here. Non-IBM vendors risk losing a substantial portion of their OA business to IBM if they are not flexible; losing the workstation part of a system is seen as a small price to pay for survival.

Vendors have approached this new reality in two ways:

- They offered their own brand name on a personal computer that is IBM compatible. Those who've fallen short of compatibility have also fallen short in market share.
- They incorporated the PC as an intelligent workstation in their product line. Departmental OA vendors such as Wang Laboratories, Inc., Digital Equipment Corp., Data General Corp. (DG) and Hewlett-Packard Co. (HP) as a group are rapidly moving beyond terminal emulation to off-load highly interactive applications such as word processing onto the PC. HP even offers the same query interface on the PC as on its own 3000 family.

There are two criteria for success using these approaches: Vendors should offer full IBM compatibility for their personal computers and provide equivalent facilities such as host access and file swapping for both the PC and their proprietary personal computers. Wang, for instance, is still trying to make its own personal computer more desirable than the PC for use with its VS system. A realistic analysis of this strategy might reveal that Wang would win more in additional VS sales and software than it would potentially lose in workstation orders by endowing IBM users with the same facilities enjoyed by its personal computer users. These include equivalent ease of switching between PC and VS environments, file conversions and virtual storage on the VS.

Happily for users, the real nub of the matter now changes from will the vendor link the PC to its

product to will the vendor offer the equivalent integration capability on the PC as it does on its own workstation — the new issue.

There are a number of approaches (hardware, software and hardware/software) being used by vendors to spin the PC into their own webs rather than lose the whole orbit to IBM. Also, there are various areas of compatibility with independent systems (text, two-way data exchange between their files and MS-DOS and terminal emulation), but few offer all three elements (see Figure 1).

Within the mini to personal computer category, HP may currently have the lead as it has endowed the PC with the most comprehensive links to its 3000 series. Having the same data access software (called HPAccess) is very appealing as the user doesn't have to learn different methods to access Ashton-Tate's Dbase II, Phoenix Computer Corp.'s Condor or HP's Image data bases.

Virtual file capability, while now necessary, will ultimately pale in desirability compared with the ability to transfer files between MS-DOS and the departmental system's applications.

Off-loading word processing onto the PC to provide better response time and save the host's cycles has been the central thrust of recent announcements by the departmental minimakers. Which company probably had the most emotional agony in deciding to allow links with the PC? Perhaps DEC with its line of three workstations. But it's possible Wang went through similar angst in packaging its word processing software and a keyboard for the PC.

Some recent company moves are the following:

- DEC will at last allow the PC to be used as a workstation for All-In-1 and has announced WPS Plus on the PC.
- DG decided the world needs a DG personal computer workstation, and it also offers a version of CEOwrite for that device as well as for the PC.
- Wang has announced its keyboard and software to provide Wang word processing on a PC in either a stand-alone or linked-to-VS fashion. There are no current plans to link the PC with OIS.
- HP announced and is shipping its own PC AT version, Vectra, which sports a complete word processing package called Advancewrite. HP also offers its Memomaker on the PC.

It's quite likely that the next area of focus will be on the physical connection aspect. Coax was all right for terminals, but with intelligent workstations it makes sense to provide for peer-to-peer facilities as well. The new dividing line might be who offers a local-area network interface — either to independent local-area nets or to their own local-area net. Here's an area for vendors to offer value-added software that makes it easy for the PC to exchange files with the departmental system and so on.

Now that Wang is pushing its new WP Plus, its old standby version is now available to the masses of IBM users who've suffered through the IBM keyboard. The Wang keyboard included in the $695 price adds the Wang cursor keys to most PC applications and the keyboard switches according to the application being used — whether MS-DOS or Wang WP Plus. You need the word processing package and connection software/hardware in order to perform word processing on the PC and upload it to the Wang VS. A PC in terminal emulation mode cannot perform word processing.

The package includes sort, math, merge print and spelling. There's an interactive tutorial for the novitiates. Floppies can be swapped with the Wang PC and documents edited without conversions.

WP Plus requires 256K bytes and two floppies or a hard drive and PC-DOS 2.0 or 3.0. WP Plus costs $695 when bought on a stand-alone basis and was scheduled for delivery in October. Wang is wisely bundling WP Plus and keyboard with both its local and remote connection offerings for the PC.

Most likely the availability of the Wang package will impact Multimate Corp., which has really made its money by offering Wang-like word processing (despite the IBM keyboard). Upon request, Multimate provides users with a back-end file conversion program so documents transmitted are received in Wang format. The real winner will likely be the program that supports the most printers and so on and also provides the best screen response time.

	Digital Equipment Corp.	Data General Corp.	Hewlett-Packard Co.	Wang Laboratories, Inc.	IBM	AT&T
Word processing on IBM PC	A	A	S (Memomaker)	A	S	No
Virtual files	S (Decnet)	S	S	No	S	A (Starlan)
MS-DOS formats to native format*	S	S	S	No	**	S
Uniform DBMS access on IBM PC and mini	No	No	No	S		(Informix)
Word processing with DCA on own PC	No	No	S (Vectra)	No	S	3rd parties

Key: S = Shipping, A = Announced
* Accepts flat files. Data General Corp. and Hewlett-Packard Co. provide conversion for certain software.
** Replaces an existing file on the System/36.

Figure 1. Levels of Connectivity With IBM Personal Computer

Wang's local office connection includes a card for the IBM PC (256K bytes or more) that must be located within 2,000 ft from the VS system. With software and keyboard, the price is $1,895; delivery is scheduled for December.

The remote office connection includes a telecommunications card (up to 9,600 bit/sec) enabling PC users to run VS applications, especially office applications. The remote office connection including keyboard and WP Plus is priced at $1,200; shipment was scheduled to start in October.

The PC can now be equipped with WP Plus software. These PCs can be linked with VS via either local or remote connections, and the PC and VS can each edit the others' documents without any conversion. But there is always one more feature that users want. In this case, the IBM user, whether linked locally or remotely, cannot store MS-DOS files. The Wang personal computer user, however, can.

In converting files from MS-DOS to VS, the remotely connected PC and Wang personal computer user go through the same procedures of converting to binary files. However, the locally connected Wang personal computer has an advantage over its IBM counterpart — it can use the Wang-supplied personal computer to VS data exchange that provides file format conversion. The IBM user needs to convert to binary files.

DG also got in the ball game and is extending its word processing into the PC users' realm with CEOwrite as well as on its new MS-DOS-based workstation dubbed Dasher/One and its DG/One portable computer.

CEOwrite can act as a stand-alone or be integrated with CEO systems. You have a choice of interfaces in addition to the standard CEO menu (such as function key, mnemonic commands and pull-down menus). This approach may be adopted by others. Features (among others) include glossary, forms merge, hyphenation, table of content generation as well as list processing. CEOwrite software costs $395 and is available 60 days after order.

CEOwrite needs 256K bytes; CEO Connection 2.2 needs 512K bytes. The CEO Connection software link provides single keystroke access to the CEO main menu from the above MS-DOS workstations. It supports bidirectional transfer and conversion of CEO word processing files on the MV host and MS-DOS files generated by CEOwrite, Micropro International Corp.'s Wordstar, Satellite Software International's Wordperfect and spreadsheets supporting data interchange format (DIF) or print image formats. You can also go directly from the main menu to CEOwrite rather than fumbling with MS-DOS commands.

The CEO Connection sells for $5,000 on the first AOS/VS machine and $2,500 on subsequent units; the license is $295 for the DG/One and $395 for the PC. In addition, the MV host can act as a virtual MS-DOS file server regardless of the source (PC, Dasher/One or DG/One).

DEC followed the rest of the gang with its September announcement that it too will off-load its word processing. WPS-Plus/PC reportedly offers full compatibility with DEC's full range of WPS-Plus products. It offers built in communications for transferring documents to Microvax and VAX systems running WPS-Plus and creates no additional hardware investment. WPS-Plus/PC runs on IBM PC and XT systems running PC-DOS 2.1, 3.0 or 3.1 with at least 384K bytes of memory, two floppy disks or one floppy disk and a hard disk. It will be available in December and costs $595.

Earlier, DEC acknowledged the existence of the PC by Decnet-DOS on the PC or XT. Decnet-DOS costs $490 on the VAX/Microvax and $500 on each PC. With Decnet-DOS, the PC is a node in the network and can store virtual files on the Decnet, which runs on whatever physical connections there are between the PCs and the VAX/Microvax.

In what could prove to be a real blockbuster move, DEC is offering All-In-1 on the Microvax. The standard features include WPS Plus, All-In-1 mail, time management, desk management, information management, help functions and computer-based instruction. The price is $12,600 and it is available now. The Microvax offering will support DEC's departmental software such as the sales and marketing as well as the business operations (Bossystem) for financial and operations management.

To customize All-In-1 features, however, you need the All-In-1 Generator Package ($5,500) and a VAX 11/750 or larger system. Run-time licenses for customized packages cost $12,600 for each Microvax II.

HP has taken an interesting approach — offering the PC some of its Touchscreen's applications (without the touch) in an attempt to make interaction between the PC and HP 3000 easier. These include Memomaker (word processing), Personal Card File, Advancelink (terminal emulation and file transfer) and HPMessage (Email).

Once burned, twice shy is the old axiom, and this time HP has decided there are virtues to being fully IBM compatible in the PC arena after watching Touchscreen garner a less-than-hoped-for market share.

In the AT round of machines, HP Vectra is ranked operationally compatible with the PC AT and has some competitive qualities (such as being up to 30% faster and having a 30% smaller footprint while accepting AT cards). But the most notable aspect is how HP has made it an integral OA element. HP emphasizes you can start a Personal Productivity Center at any level — even with two PCs. Vectra Office represents a high-level word processing system that is PC compatible and offered by a major vendor with lots of support.

The Advancewrite package is a greatly enhanced version — expedited and tailored to the Vectra keyboard (30 function keys) — of Samna Corp.'s WP that's available in three levels. HP customized the videodriver and also expedited the printing facility. The screen is of relatively high resolution with 640 by 400 pixels and its clarity when scrolling is a challenge to any dedicated word processor. While Level III includes a spreadsheet, you cannot insert graphics into WP yet; that facility is scheduled for first quarter 1986.

The price for the Vectra Office configuration (640K-bytes memory, multimode and color-adapter cards, dual RS-232 C cards and keylock) is $5,229 for dual 360K-byte floppies (1.2M floppies are available) and $6,604 for a 20M-byte hard disk system with one floppy. Prices include a monochome display. Advancewrite I and MS-DOS 3.1. Users may select different Advancewrite levels for the price difference. Advancewrite I (footnotes) is $295, Advancewrite II (spelling check, table of contents, mailmerge, glossary) is $550 and Advancewrite III (spreadsheet, full text search) is $695.

Vectra does not include read-only memory-based terminal emulation capabilities embodied in the Touchscreen.

Instead, you may add Advancelink 2392 software ($295) to allow access to the 3000's electronic mail package (Deskmanager) as well as other applications.

HP also unveiled a local-area net dubbed Officeshare that is based on 3Com Corp.'s card and MSNet with some goodies from HP such as transparent data location and so on. Officeshare can link Vectra, Touchscreen I and II and PCs as well as 300s to an 802.3 network.

Officeshare can function as a local-area PC net with a dedicated controller (either a Vectra or a Touchscreen) or as a point-to-point link between PCs and a 3000 when the PCs have Advancelink 2392 software. Software for the Vectra server costs $2,298; it costs $848 to link a Vectra onto the network. Although there's a price involved, this is a feature that isn't available with IBM's System/36 and PCs.

Although Honeywell, Inc. isn't usually thought of in the same breath as these mini vendors that have effused an OA attitude, it too has a link between MS-DOS-based PCs and its mainframes. The PC78000 software now includes file transfer that allows file transfer between MS-DOS machines running Kermit and Gcos 8 systems, between MS-DOS machines and Honeywell DPS 7 or Multics host systems with Kermit. The extended PC7800 package costs $495 per PC.

CPT Corp., another vendor, has taken a couple of approaches to integrating the PC. It has put its word processing on a PC in the form of CPT Personal Typewriter and also terminal emulation via the CPT Open Connection.

The CPT Personal Typewriter ($300) requires no hardware modifications and permits access to DOS files. Billed as a subset of CPT word processing, basic features include calculating, sorting and use of a keyboard program key. It requires a 256K-byte memory. Documents can be transferred via the SRS45 or the Office Dialog System to the 8500 series and the Phoenix and Phoenix Jr. You can make a printer file of Lotus and transfer it to CPT, where it could be edited sans formulas. It didn't handle underlines particularly well when seen last winter.

Built upon the Unix-based CPT Office Dialog (alias Convergent Technologies, Inc.'s Megaframe) that can network up to 128 workstations and PCs, Open Connection ($2,000) provides access to word processing, filing, central printing and electronic mail to local and remote terminals.

NBI, Inc., another vendor, was one of the first to embrace PCs. It allows PCs (and its own) to link with Oasys 64 via a multinet twisted-pair link. You need a $600 card in the Oasys.

For more than a year, Syntrex, Inc., a vendor, has offered its Syntrex connection that consists of a $900 board and software for a 256K PC. This allows users to convert PC files into Syntrex text files for incorporation into other text documents, distribution or access by other Syntrex stations. In another example, Datapoint Corp., a personal computer maker, has a $695 adapter card that fits within a PC and a $75 software package that allows the PC to connect with the Arc network and to emulate a Datapoint workstation. There is also some file translation capability between MS-DOS and Datapoint.

Personal computer maker Xerox Corp. provides a board and software ($795) to allow a PC to interconnect with its Ethernet scheme. Once connected, the PCs can use the other network resources such as printers and servers. Text files in an Epson print format can be printed out on any network printers (after being converted to the Interpress Architecture). Mail sent by PCs can be read by any other network workstation.

While personal computer maker Convergent Technologies, Inc. has not yet joined the trend, it should be able to as it has the ability to convert MS-DOS and Cpos files.

■

Upton is director of Integrated Business Systems Advisory Service at International Data Corp., Framingham, Mass., and editor of the Office Automation Reporting Service.

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UNLOCKING THE MICRO MARKET

By Amy D. Wohl

Although thousands of personal computers are still being bought, a change is taking place in microcomputer marketing. Fortunately for personal computer vendors, this is a change that will refresh. Users are not losing confidence in the concept of the personal computer, but rather they are making certain the personal computers they had already bought were being used. Perhaps equally important, it is a case of the market waiting for the next generation of products.

Millions of desktops remain bare, unadorned by microcomputers. This is a temporary state to be corrected with dollars, an increase in computer literacy, increased usefulness of more software, better personal computer prices (that is, more computer for less money) and more interesting office system environments (attaching personal computers to each other and to shared data and devices).

But what can we buy now and should we? An interesting pattern emerges.

The first generation of computer users have long become our local gurus, dispensing advice (and sometimes amused scorn) as they watch new users struggle to use machines that are far friendlier and more capable than the original personal computers with which they started out. Gurus tend to use the newest, shiniest personal computer in the office. Today that means an

IBM Personal Computer AT with everything, attached to a Hewlett-Packard Co. Laserjet printer. This power-user workstation has more computing power than many mainframe computers offered in the 1970s. A few early personal computer pioneers, however, run counter to this trend. They like to hang onto the first personal computer they bought and scorn those less hardy souls who want user friendliness or hardware that is recognized by the repairman.

Newer users employ mainly IBM PCs. The standard for most office users today is an IBM Personal Computer XT with maximum memory, moving up to an AT if the user wants faster processing, more storage (the newest ATs offer 30M bytes standard, 60M bytes available) or more prestige. New users often get PC hand-me-downs, with the newest machines going to more experienced PC hands, with their greater capability needs.

Generally speaking, business personal computer users use the business PC (that is, they buy IBM PCs). A vocal minority buy IBM-compatibles from vendors such as Compaq Computer Corp., Sperry Corp. and many IBM competitors. Interestingly, personal computer products that are better (faster, with more graphic capability, cheaper, more rugged) than the IBM PC are not generally successful unless they are also completely IBM-compatible. Now vendors are bringing out the second generation of clones, and they are designed to win; hence, they tend to be entirely IBM-compatible. The newest users are not into traditional PCs. They want to employ the power of the PC, but are often creative folks who relate to words or images rather than numbers. For them, user-friendly devices like Apple Computer, Inc.'s Macintosh are appealing. And they haven't failed to notice that the Macintosh is now a stamp of affluent consumerism, appearing on desks, in trendy apartments and in advertisements for everything from cream cheese to banking services. An amazing number of these noncompatible IBM PC users have begun to appear. Recent clients in major corporations and smaller service companies have included a number of Macintosh users. And a surprising number of computer industry writers swear by the little devils.

This seems to mean that we are growing up in a two-world business: an IBM and IBM-compatible world in which most business products are bought and sold and an Apple Macintosh-compatible world which can touch (but not yet very securely) the IBM world. Industry commentators expect this touching to become more intimate over time, as Apple tries to leverage itself into the IBM world and third-party hardware vendors jump onto the bandwagon.

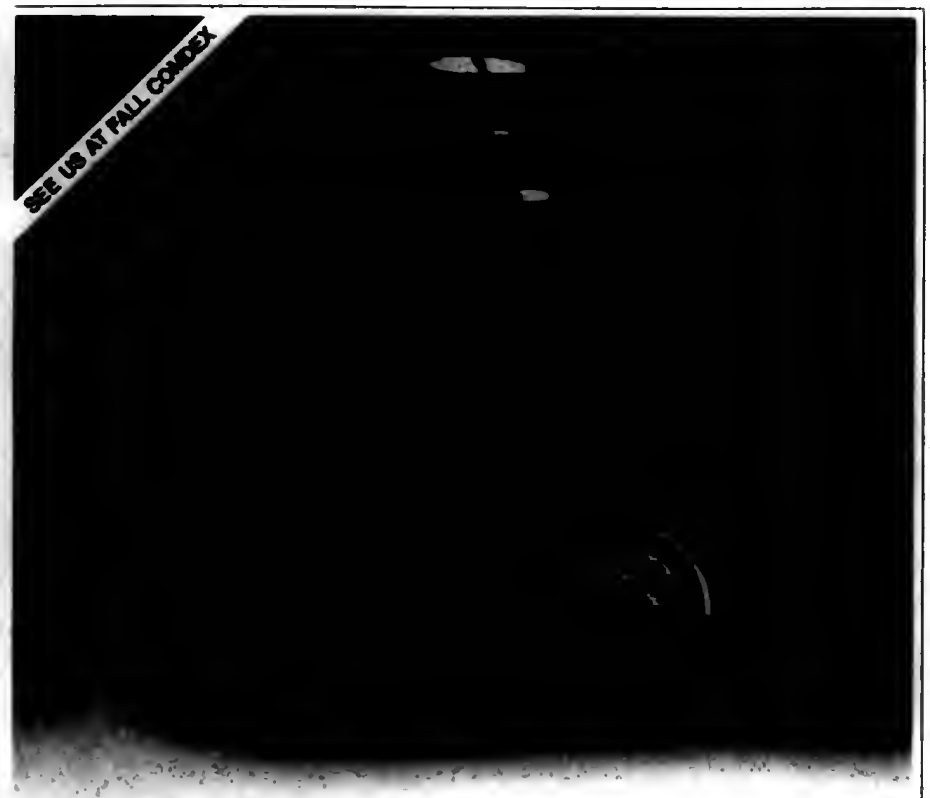
A third world exists, of course, made up of machines that are struggling for market share. This includes products such as single-user Unix machines, most notably the AT&T Information Systems 7300; noncompatibles like Digital Equipment Corp.'s Professional 300; special purpose, industrial strength micros from Apollo Computer, Inc. and Sun Microsystems, Inc.; all of the proprietary operating system portables; and new toys that could become business machines like the Commodore Business Machines, Inc.'s Amiga. Most of these systems will never be sold in sufficient quantity to create a market for software; therefore, almost no software will ever be developed for them. This vicious cycle prevents the machines from ever being successfully used because most personal computer users are not looking to write their own software, but rather to buy some.

We are growing up in a two-world business: an IBM and IBM-compatible world and an Apple Computer, Inc. Mackintosh-compatible world.

We will, of course, make an exception for the Unix-based machines. This marketplace continues to grow, albeit much more slowly than contemplated. Eventually, it will be another standard, but not likely one that challenges IBM's MS-DOS machines for market dominance.

The years 1985 and 1986 will be noted for when personal computer users (in volume) started to recognize the limitations of individual personal computers and began to scheme to interconnect them into useful multiuser systems. This could mean buying local-area networks plus servers and software (such as Xerox Corp.'s Ethernet, IBM's PCN, AT&T's Starlan). Or the user can choose from among dozens of systems that can serve as integrators for personal computer workstations. Dozens of choices exist, from every vendor's office automation system (for example, DEC's VAX with All-In-1, Wang Laboratories, Inc.'s VS with Wang Office or IBM's System/36 with Personal Services/36 and PC Attach) to a variety of general purpose minis, superminis and mainframes.

The notion of buying micros first, as individual personal productivity tools, then buying the systems that tie them together and permit office automation to take place, has become far more pervasive in the marketplace than any sales of



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For the Parrot aficionado: yes, we know this is a rear engine car. We are showing the addition of a second engine to symbolize how Pfaster can be added to your PC or XT to increase performance.

Vendor	Model	IBM Compatible	Microprocessor	Memory (Minimum/Maximum)	Storage	List Price (Base System)
IBM	Personal Computer	Yes	8088	256K/640K	Floppy (360K)	$1,995
	Personal Computer XT	Yes	8088	256K/640K	Floppy (360K) Hard (10M)	$3,895
	Personal Computer AT	Yes	80286	256K/3M	Floppy (360K, 1.2M) Hard (30M)	$3,995
Apple Computer, Inc.	IIc	No	68C02	128K/128K	Floppy (360K)	$1,295
	Macintosh	No	68000	128K/512K	Floppy (360K)	$2,195
Digital Equipment Corp.	Rainbow 190	No	8088	640K/896K	Floppy (800K) Hard (10M)	$6,495
	Professional 380	No	PDP 11/23	512K/2M	Floppy (800K) Hard (10M)	$6,025
Hewlett-Packard Co.	150	Yes	8088	256K/640K	Floppy (360K) Hard (15M)	$3,495
	Vectra	Yes	80286	256K/3.6M	Floppy (360K) Hard (40M)	$3,199
Compaq Computer Corp.	Deskpro	Yes	8086, 8088	128K/640K	Floppy (360K) Hard (30M) Tape (10M)	$2,240
	Deskpro 286	Yes	80286	256K/8.2M	Floppy (360K, 1.2M) Hard (70M) Tape (10M)	$4,244
Texas Instruments, Inc.	Professional	Yes	8088	128K/768K	Floppy (360K) Hard (10M)	$2,395
AT&T	6300	Yes	8086	256K/640K	Floppy (360K) Hard (10M)	$3,010
	7300	No	68010	512K/2M	Floppy (360K) Hard (20M)	$5,095
Wang Laboratories, Inc.	APC	Yes	80286	512K/2M	Floppy (360K) Hard (67M) Tape (43M)	$3,465
Data General Corp.	Dasher/One	Yes	8088	256K/640K	Floppy (720K) Hard (10M)	$2,100

Figure 1. Personal Computer Hardware

integrated and complete OA systems. Every vendor has dashed to get onto this bandwagon: personal computer vendors offering their own local-area net and file servers and integrated systems vendors rushing to offer the ability to connect IBM PCs to their systems as alternative workstations. We call this easy-to-start process bottoms up systems design.

In order for this useful notion to work, it is necessary to exert some self-control. It is not possible for every user to buy any personal computer they might choose and then to interconnect the result into a smoothly running whole. In fact, not only does the hardware require some compatibility, the software the personal computers are utilizing also requires some standardization. Ahead in the future (way ahead) are systems that permit any workstation to connect to any system and any software package to talk to any other.

But what happens next? The game continues. Count on IBM to announce a new generation of PCs pretty soon (probably first quarter 1986). But don't worry they might be noncompatible with the PC or PC-compatible you already own. Not even IBM could stand up to what the market would say if their next generation of products is less than friendly to those millions of PCs we've already bought.

IBM will probably choose a compromise position. Look for a PC2 announcement (called something else, of course) to focus on what's new — maybe faster processing, bigger disks, more memory, an alternative operating system or user environment — and to reassure users the good, old world of the MS-DOS IBM PC is still there on the new machine.

Soon, perhaps in the next announcement, we expect IBM to find a way to make certain highly attractive features available only to IBM software users (most likely some high level of integration or some glamorous interface). This will be a requirement sooner or later if IBM is to meet its ambitious goals in the personal computer software market.

Expect some of the research IBM is doing in other areas will turn up in improved and enhanced PC products, things like reduced instruction set (Risc) machines, bit-mapped, high-resolution displays, truly friendly software and so on. Of course, other vendors are also working on these technologies; action from them can also be expected.

But we expect IBM to hold on to its strong lead in the business PC marketplace. Features of this market continue to include the following:

- A strong affinity for data processing control and, therefore, a preference for vendors popular with DP staff. Read mainly IBM.
- A strong desire to standardize on a single product line of compatible products to ease the organization's way into an integrated multiworkstation environment. With its strong headstart, this trend is clearly in IBM's favor.
- A big influence on other markets for whomever controls the office marketplace. That is, most home buyers of high-end systems (and nearly all portable buyers) are looking for a machine that can do office work at home (or on the road). Therefore, the value of compatibility is very high, and you know who wins this one.

What happens to the other vendors? IBM-compatible vendors live or die at IBM's pleasure. That is, IBM will support pricing policies that give vendors room to breathe as long as vendors continue to prove IBM does not have a personal computer monopoly and fail to sell more product than IBM is willing to give up. Incidentally, this could mean success for a new vendor like AT&T Information Systems with its beginning-to-succeed 6300 PC-clone and could spell hard times for Compaq Computer Corp. if IBM has a fixed amount of market share in mind for its competitors and no need for two successful competitors to prove its point to the Justice Department lawyers.

We suspect the market will break out this way:

- Compaq gets to live. They are a well-managed company with a superior product, and they aren't big enough to elicit extreme levels of concern from IBMland. (You could argue that they have now gotten too big for IBM to pick them off, but that is a different article).
- The multiproduct companies that produce an IBM-clone for their own customer base get to live, but they will never get the significant market shares they crave. It doesn't matter whether they offer a superior product. Compatibility and small blue letters on the box are what customers crave. The key to success here is to produce a true IBM clone or to hide a true clone under your superior product. All else seems to fail.
- Single-product clone vendors get to disappear. They're almost all gone or are going now, and the rest are having problems.
- Innovative products that are IBM PC-compatible get breathing space, but not big market shares.
- Innovative products that are not IBM PC-compatible don't get much of anything, except ignored in the marketplace. Of course being ignored might still let you sell a few hundred thousand boxes. (Ask Apple how Macintosh is doing.) And if your noncompatible product shows promise, someone else is sure to provide a kit that makes it more-or-less compatible, perhaps in the nick of time. Colluding to make sure IBM compatibility somehow occurs is probably a very good idea.

In the next round, if IBM's idea of innovative isn't very good (it's going to be hard to be innovative now that IBM's PC organization has been co-opted back into the Big Blue way of thinking, IBM Zen, I suppose), and someone else is very innovative yet still very IBM compatible, remove all the current leg irons and start thinking about singing a new song.

If you'd like to help us have a merry Christmas, do let us know that your very innovative, very compatible product is on the way. We'll want to wish it a Happy New Year.

Wohl is president of Wohl Associates, a consulting firm in Bala Cynwyd, Pa.

Laptops: Why Isn't the Market Booming?

By Jenny Charlesworth

The deciding factor of who will win in the laptop computer market may be a result of which vendor is most active in tracking and addressing user needs. Several areas of greatest concern among users appear to be screen resolution, available memory, price and IBM's entry into the market.

According to a study by Market Intelligence Research Co. of Palo Alto, Calif., the briefcase-size computer (fits in a briefcase, under 15 lb) is going to take over the portable computer market by 1988. Analysts at Market Intelligence Research have two predictions: The market for briefcase-size computers will reach $11.3 billion in 1990, far surpassing the handhelds and suitcase models, and technological advances (such as improved display quality, larger memory sizes and lasting power supplies) will be arriving soon, along with lower prices.

Major factors to consider in the selection of a display are resolution, contrast and color. Currently, you can choose from four main options. Liquid crystal display (LCD) is the most commonly used due to its low power consumption, durability and light weight. Images on the screen are created when an electronic charge activates two polarized circuits within the LCD, creating a dark image. If not used under optimum lighting conditions, it can be impossible to read. Electroluminescent display (ELD), an alternative to the LCD, offers high resolution. ELD provides its own light source from behind the display; users no longer need to rely on light from the environment.

	1984	1985	1986	1987	1988	1989	1990
Sales Force Automation	30,000	36,000	48,000	75,000	105,000	125,000	142,000
Professional Travel	136,950	160,200	178,500	192,000	202,000	214,000	225,000
Other	8,000	13,000	22,000	27,000	32,000	40,000	53,000
Total	174,950	209,200	248,500	294,000	339,000	379,000	420,000

Source: IDC — 9/30/85

Figure 1. Shipments of Portable Personal Computers in U.S. Market

Another alternative is gas-plasma display (GPD), neon gas captured between electrode grids that light individual pixels when charged. The charged neon then generates light. GPD is more easily read than LCD, but costs more. CRT displays, a fourth option, are used in personal computers, but are too large and consume too much power to be used in laptops. Several companies, however, have developed folded, flat CRT displays that are smaller and lower in power usage.

Memory capability is one laptop feature that has become comparable to the desktops. Most portables today have some read-only memory and random-access memory and most have built in or optional floppy disk drives for additional storage. Units for business feature 128K bytes, some a minimum of 256K bytes. Unfortunately, storage is limited by size of the unit; as a result, vendors need to be geared more toward 3½-in. diskettes. Though some laptops still use 8-bit processors like the Zilog, Inc. Z80 or Cmos 80C85, most of the newer models such as the Morrow Pivot, Grid Systems Corp. series, Data General Corp. Data General/One and Hewlett-Packard Co. 110 use variations of the 16-bit 8086/8088 series of microprocessors.

The cost of portables may be the major obstacle to overcome in user resistance. But buyers may already be seeing the beginning of a price war with DG's Data General/One September price reduction announcement. "It is now possible for customers to recognize the benefits of portability without paying a significant premium for that advantage," Cliff Bream, vice-president and general manager of DG's desktop division, said.

No doubt prices will fall as manufacturing costs go down. "Everyone thinks the price threshold for the market is lower than the machines are now, so people are not going to buy them for $3,000, but they will buy them for $500. Somewhere in between you start to get a lot of units sold," Steve Bosley, client service manager of micro services at International Data Corp. in Framingham, Mass., said. (See Figure 1.)

But where does IBM stand in this small-is-beautiful market? Results of a recent IDC study showed the market impact of the rumored IBM laptop should not be underestimated. According to IDC, the product will be very similar to Data General/One and HP 110 and offer LCD screen, battery power and some level of compatibility with the present PC-DOS environment.

The IBM laptop, code-named Clamshell or Ozone, is not expected to be a major contributor to IBM's revenue, according to IDC, primarily because the market is not nearly as large as it was once expected to be. In fact, IDC predicted that the market for laptops will probably be less than 10% of the total personal computer market.

Interestingly enough, IBM may not be the only company subject to rumors concerning the portable market. It has long been speculated that Compaq Computer Corp. and Apple Computer, Inc. may also be in the running for market share. There is a generation of portables and portable users to learn from, and both Apple Computer and Compaq Computer are reported to have done development work in the laptop area.

However, according to IDC's Bosley, "The market is too small — 175,00 units sold is nothing."

Charlesworth is publications administrator for Computerworld Focus.

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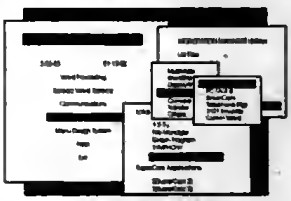

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Industry watchers have recognized that market potential and the competition in the micro third-party service arena have become intense. Major manufacturers such as Xerox Corp., Honeywell, Inc. and TRW Corp. helped legitimize the third-party service field when they entered the business; now, older mainframe and mini service providers are making a big push to gain market share in the micro area.

A total of more than 400 companies are working to gain part of a business estimated to grow from $390 million in 1985 to $970 million in 1990, according to researchers at Input, a market research firm in Mountain View, Calif.

"The third-party market is not the unknown quantity it was a couple of years ago," John Erlandson, manager of the customer support program at Input, said. "Now, we see a lot of companies getting into the third-party market. This lends a lot of credibility to the market."

An intense competition among these companies, which has worked to the customer's advantage as companies build customer bases through quality service, is the result. "The competition is fierce," Rudy Heydu, general manager of MTTR, Inc., a high-technology field service company based in Trevose, Pa., said.

"Everybody can find a niche, but what's going to happen long term is that not all the vendors can make it," Heydu continued. In that effort to be successful, third-party micro service companies can provide just about any kind of maintenance the customer wants.

For large customers, third-party service providers will set up a maintenance area on site, stocked with the most commonly needed spare parts. This type of service is expensive, but usually the quickest.

But much of the growth in the third-party micro service field has come from on-site service. Most companies will respond to a call for help within four hours, as long as customers maintain contracts on their machines. Monthly fees on contracts usually include time and material charges. "Most customers just want someone to come in and fix their machines," said Thomas Quinn, vice-president of sales and marketing at First Data Resources Field Service Co. in Westlake Village, Calif., a wholly owned subsidiary of American Express Co. That's because customers begin to recognize the potential of their microcomputers. "Businesses have become accustomed to using their machines, and they want them repaired immediately," Michael Chamberlain, senior vice-president of field operations for Sorbus, said.

Third-party companies will also pick up and deliver a down computer or they will accept defective machines through the mail. But service of this type is useful only for customers who don't mind a couple of days of down time.

The price range for service is just as varied. Depending on customer requirements and the machine to be serviced, contracts range anywhere from $80 to $400 per month, a representative from Input said. For machines not covered under a contract, third-party companies generally charge between $60 to $100 an hour for labor.

National third-party service companies maintain hundreds of offices throughout the country. They forge agreements with system manufacturers to supply them with spare parts, which are maintained in these regional offices. "We can track a spare part right down to the field engineer's luggage," Sorbus' Chamberlain said. Reputable companies will sponsor ongoing training in system technology for their field repair staffs.

Third-party companies have picked up a major chunk of business from customers who find traditional service arrangements not suitable for micros because of the mix of products they put together. "Most large corporate users are sophisticated enough to put together systems from various industry offerings," Chamberlain said. "An independent maintenance company has the capability of maintaining all the pieces of the system."

Third-party companies have picked up a major chunk of business from customers who find traditional service arrangements not suitable for micros because of the mix of products they put together.

Third-party service also makes it easy for companies with scattered offices to maintain their micros. "When you have a company based in one small area, other types of service are attractive to the end user," Quinn said. "When you get into a larger geographic area, a national service company makes it much easier to do the service."

But the multitude of firms providing independent service makes choosing a company a difficult task. Regional reputation is a key indicator of a company's performance, according to George Harmon, chairman of the board of Service Intelligence Corp. in Westlake Village, Calif., a service consulting firm. "The smart end user is going to be calling for references," he said.

It's also important to make sure a third-party company can service all of a customer's needs. "End users have to look carefully at whether or not a company is capable of servicing their whole product line," Harmon said. "There are a lot of them who specialize in certain areas."

Users need to also look at what kind of backup support the third-party service company offers, what its spare parts maintenance is, what kind of educational programs it offers and its relationship with the manufacturers. And customers should protect themselves by explicitly spelling out service requirements in a contract with the service company, maintenance company executives said.

Some personal computer dealers offer service contracts with third-party companies rather than doing the service themselves. Those dealers can often recommend the maintenance company to fit a customer's needs. Just in case the user is looking for some more protection, insurance companies have even gotten into the service business. National Warranty Corp. located in Wheat Ridge, Colo., sells service insurance through dealers. In the event that a customer's service arrangements with the dealer or system manufacturer doesn't work out, National Warranty will provide service through a third-party company. The company sells both 18-month policies and three-year policies.

Most third-party companies maintain that their prices are about 20% lower than those of traditional service arrangements with manufacturers, and the cost of service is expected to decrease significantly in the future because of the competition and the resulting efficiency of these companies, Erlandson said. "In the old days, it was expensive to service micros. There were only a few out there. Now, with a million personal computers installed, it's much more efficient."

Micros are cheaper for companies to service than larger systems, another reason maintenance prices are expected to drop. This reliability used to make large customers wary of establishing service arrangements. Not so any longer, Wolff said. "There is a substantial trend setting and growing group of people who are aware of the need. Even first time buyers are realizing the potential of service," he said. "There are so many horror stories about broken machines that people are recognizing the value of service. One guy told us about a dentist who spent $19,000 on a system that's sitting idle because it's always broken and he can't figure it out."

In fact, most service companies estimate the typical micro system needs repair an average of one time to two times per year. Disk drives and printers cause the most problems, but a few days of down time on anything helps convince customers that service is something they need, Chamberlain said. "Most people are initially reluctant to make a commitment to service, but when their machine breaks down, they want it fixed right away."

Maintenance companies have not yet dealt with a major user service need — software support. "We anticipate that software support will be a crucial problem in the future," Input's Erlandson said. "How to separate software from hardware problems. The user isn't aware of the intricacies. As software becomes more complicated, it will be a tough area for manufacturers to deal with. It's a huge need."

Software is not our business, countered Sorbus' Chamberlain. "We do not service software," he said. "In training, we respond a full week with software, so we can determine if the problem is a software problem. We help out as much as we can, but we can't solve a software problem."

Depke is a senior writer with Micro Marketworld, *a computer retail trade publication of CW Communications, Inc.*

Spotlighting Desktop Laser Printers

By Lee White

Although the mere thought of lasers no longer only conjures up images of Flash Gordon, it's still hard to believe that laser technology will be sitting next to that commonplace item, the personal computer.

There are reasons for the attention now being focused on these new personal computer peripherals. Desktop laser printers are fast, usually producing up to 8 pages per minute. Their 300-dot by 300-dot resolution is spectacular. In most cases, text and graphics combine easily on the same page, making a low-cost in-house publishing facility feasible.

But the drawbacks may outweigh the advantages. Eight pages per minute is fast; 19 pages per hour, the maximum number recommended, is less attractive. Price ranges of $3,000 to $7,000

and more put the desktop laser out of the reach of many. Quite a few of the printers cannot operate within a network. Software incompatibility and increased maintenance and supply costs complete the picture of the fledgling desktop laser printer market today.

What exactly is a laser printer and how does it differ from the more commonly used and understood daisy wheel and dot matrix printers?

Tom McMurray, product marketing manager in the Terminals Business Unit of Digital Equipment Corp., explained laser printing technology as a totally enclosed low-power beam that scans back and forth across the surface of an electronically charged belt made of photosensitive material. The laser beam discharges all areas of the belt that will not be printed, leaving an electronic image of the page. The belt then passes near a magnetic roller covered with oppositely charged toner particles. The toner is attracted to the latent image on the belt, forming a toned image.

Farther along the paper path, the page passes between the belt and another charging element that attracts the image from the belt onto the paper. This image is then firmly affixed via heat and pressure fusion. The belt is erased and recharged for the next page.

As with draft printers, laser printers form images using dot matrix patterns. Laser printers, however, pack more dots into the same area. This creates superior print quality for characters, lines, forms and fonts.

Computer companies have targeted laser technology for intensive research in order to develop more economical laser printers. Consequently, quality of lasers and other components has increased while costs have significantly decreased in the last several years. New technology has reduced costs to the level where laser printers are almost feasible for single- and multiuser computer systems, while they were initially cost-effective only for use with mainframe computers and high-volume form printing jobs.

Not everyone, however, has jumped on the laser bandwagon. Management at Brother Industries, Ltd., an old-timer in the typewriter and printer market, has no laser printer entry and no plans at this time to bring one to market. According to Robert Hawthorne, director of product development at Brother Industries, their typical customer needs letter-quality printing but often on odd-sized paper and multipart forms, applications that nonimpact printers cannot provide. His other concerns include the issue of software incompatibility and that most of the software is written for daisy wheel and dot matrix printers.

However, Hawthorne doesn't rule out laser printers as a future product for his company. "As the price of laser printers comes down and the software matches [occur], we will be interested in a laser printer. In fact, we're interested in having the opportunity to OEM one from another vendor," Hawthorne said.

Another nonplayer in the low-end laser printer market is Big Blue itself. But IBM's nonstatus is probably temporary, according to Aaron Goldberg, director of Micro Advisory Services at International Data Corp. (IDC) in Framingham, Mass. Goldberg explained that the opportunities for profit are greater these days in the peripheral market.

Because IBM has rarely let a profitable market niche escape it, its entry into the laser printer area might occur soon. "I think it is a natural move for IBM to want to get into this very important peripheral area. I wouldn't bet that [IBM would sell] its own machine, but I think they will be selling something," Goldberg predicted.

Most of the consultants contacted agreed with Goldberg's optimism about the laser printer market. Hedy Taub, senior researcher with Richardson, Texas-based Future Computing, Inc. said Future Computing sees the low-end, desktop laser printer market as a very strong one. "We see it as a growing market, replacing solid font printers in the office environment and really being used for a lot more applications and tremendously expanding its user base."

The market for desktop laser printers is brand-new. The age of the desktop laser printer for personal computers was born in 1984, according to a report entitled *Printers in the Office 1985*, published by IDC in September of that year. It began with Hewlett-Packard Co.'s Laserjet and was followed by the Apple Computer, Inc.'s Laserwriter, Xerox Corp.'s 4045 and DEC's LNO3.

Laser printers have the ability to print text and graphics on the same page, are extremely quiet and offer near-perfect resolution. Disadvantages include very low volume ability, nearly nonexistent envelope addressing ability, lack of compatibility with many software packages, need for more care and maintenance than dot matrix or daisy wheel printers and increased supply costs.

Of the above disadvantages, perhaps the most burdensome is the low volume ability or duty cycle. Although most of the low-end laser printers can produce 8 or more copies per minute, manufacturers suggest the maximum duty cycle is approximately 3,000 copies per month (about 150 copies a day or 19 copies per hour).

What happens if you leave the printer on and try to push it beyond its recommended limits? "Quite simply, you'll have a meltdown," Gerald Babb, vice-president of marketing for Corona Data Systems, Inc., said. "[Laser printers] have to be turned off and cooled down for so many hours during the day. Continuous operation over a long period of time will literally cause a premature death. It will not sustain itself."

Despite drawbacks, however, laser printers are expected to do well financially. According to the IDC survey, shipments in 1984 were 16,000 units, but forecasted shipments for 1990 are expected to reach 185,000 printers. Because of the limitations inherent in the breed, however, low- and medium-usage laser printers will augment rather than supplant other types of printers.

Jim Minervino, research analyst in the Printer Market Program at IDC, provided figures as of September 25, 1985 that were even more impressive. According to the research, forecasted sales for desktop laser printers will reach 234,000 in 1990, and the installed base at that time is expected to reach over 1 million units.

Despite drawbacks, laser printers are expected to do well financially. Low- and medium-usage laser printers, however, will augment rather than supplant other types of printers.

Minervino sees technological advances proceeding at a faster clip than originally thought. He credited this primarily to the commercial availability of the Canon U.S.A., Inc. engine, which revolutionized the industry. He also predicted lower cost and slightly slower printers with duty cycles doubling within the next two years.

"There is a rumor going around that at Comdex in November Ricoh [Corp.] will introduce a 5-page-per-minute printer that will sell for under $1,000," Minervino said. This would make laser printers affordable for almost all business personal computer users, especially those whose personal computers are part of local-area networks.

The following is a sampling of some of the low-end, desktop laser printers currently available:

■ Hewlett-Packard Co. (HP) offers two laser printers for the microcomputer market. Both Laserjet and Laserjet Plus are based on the Canon LBP-CX technology. Laserjet operates with HP's own family of personal computers, in addition to the IBM Personal Computer and IBM PC-compatibles, Apple Computer, Inc.'s Apple II and Macintosh, Texas Instruments, Inc.'s Professional, DEC's Rainbow, Tandy Corp.'s Tandy 2000 and computers from AT&T Information Systems, NCR Corp., NEC Information Systems, Inc. and Wang Laboratories, Inc.

Laserjet registers a noise level of less than 55 db, printer output resolution is 300 by 300 dots/in. and print speed is 8 copies/min. In addition to the standard typewriter Courier 10 font, which comes with the printer, four other fonts in plug-in cartridges are available. The printer uses standard cut sheet paper, legal-size paper and European sizes A4 and B5 and will process bond letterhead, envelopes, labels and transparencies designed for photocopiers. Laserjet also comes with a built-in sheet feeder that can handle 100 sheets at a time. Two-sided printing can be accomplished manually. The disposable printing cartridge lasts for about 3,000 pages.

Laserjet is 18.5 in. wide, 28.2 in. deep (with trays) and 11.4 in. high and weighs 71 lb. It is priced at $2,995.

Laserjet Plus has all the capabilities of Laserjet, but adds 512K bytes of memory and provides users with advanced graphics, down-loadable fonts and electronic forms capabilities. Laserjet Plus costs $3,995. Laserjet printer owners can upgrade to Laserjet Plus with an upgrade kit costing $1,495 through December 31, 1985; after that, the kit will cost $1,995.

■ Corona Data Systems, Inc. LP-300 laser printer is also based on the Canon LBP-CX engine. The printer operates with all IBM PCs and IBM PC-compatibles. In addition, LP-300 has an Epson America, Inc. Emulator, allowing the printer to process all Epson MX-80/100 and RX-80 escape codes.

LP-300 has a noise level of less than 55 db, offers 300 dot/in. output resolution and prints up to 8 pages/min. Thirteen fonts are provided on the software diskette packaged with the system with 26 additional fonts available. The printer accepts all standard paper types in letter, legal and European A4 and B5 sizes. A paper tray for automatic feeding is standard with the system. The print cartridge is good for 3,500 pages.

LP-300 measures 18.5 in. wide by 16.2 in. long by 11.4 in. high and weighs 55 lb unloaded. The entire system sells for $3,395.

■ Also based on the Canon LBP-CX engine, Apple's Laserwriter can be shared by up to 31 users in a work group via Apple's Appletalk personal network. In addition, through a built-in program to emulate the Diablo Systems, Inc. 630, IBM PCs and IBM PC-compatibles using many software programs can print directly on the Laserwriter with no software modification.

Laserwriter has an operating noise level of less than 55 db, provides print resolution of 300 dots/in. for both text and graphics and has an output rate of up to 8 pages/min. Although Laserwriter produces the best output on 16 lb to 21 lb single sheet copier bond paper, the printer will accept most letterhead and colored stock from 8 lb to 34 lb and standard overhead transparency material from the automatic feeder. Envelopes and labels can be manually fed.

In addition to the ordinary fonts, Laserwriter is the first personal computer printer to be awarded license to use the original Helvetica and Times typefaces, making Laserwriter a particularly good choice for desktop publishing applications. The toner cartridge lasts for 2,000 to 3,000 pages.

Laserwriter measures 18.5 in. wide by 28.2 in. deep (with trays) by 11.5 in. high and weighs 77 lb. The suggested retail price is $6,995, including toner cartridge.

■ DEC's contribution to the laser printer market is LNO3, based on the Ricoh engine. LNO3 operates both with multiuser and single-user systems. At this time, the printer is compatible only with DEC computers.

LNO3 provides text resolution of 300 by 300 dots/in., simple business graphics resolution of 150 dots/in. and prints at 8 pages/min. LNO3 comes with 16 resident fonts. Optional fonts are available in precoded read-only memory (ROM) cartridges or in host media that

are downline-loadable to 128K bytes of random-access memory (RAM) cartridges, offering 24 fonts/page.

Of particular interest are the paper handling capabilities of the DEC printer. The paper input tray holds 250 sheets and the exit paper path automatically collates output in a 250-sheet output tray. LNO3 handles 8.5 in. by 11 in., 16 lb to 24 lb cut sheet paper. Transparencies can also be printed by loading plain paper copier acetate into the input cassette. Toner is added every 3,000 pages, the print belt is changed every 10,000 pages.

LNO3 is 15 in. high by 21 in. wide by 23.5 in. deep, weighs 80 lb and costs $4,195.

■ Xerox Corp., long the leader in the high-speed copier market, recently introduced its new desktop laser printer, the 4045 Laser CP. In addition to its ability to be shared by up to four personal computers, Laser CP can also operate as a distributed printer in IBM 3274/3276 networks using IBM Systems Network Architecture Data Link Control (SNA/SDLC) as well as in IBM Systems 34/36/38 environments.

The printer has 128K bytes of memory with optional memory expansion of 384K bytes to provide bit-mapped graphics printing and for receiving fonts from host computers.

Unlike most other laser printers in its price range, Laser CP provides for 10 page/min output and its duty cycle is 5,000 pages/month. The printer includes two resident standard fonts and offers up to four optional ROM cartridges, allowing up to 36 different fonts to be loaded and accessed from the cartridges. A 250-sheet paper cassette holds letter- or legal-size paper; optional cassettes are available to feed 8.5 in. by 13 in. paper or European size paper. Laser CP also accepts colored or prepunched paper, transparencies and gummed labels.

Laser CP requires 22 in. by 28 in. of space on a desktop and sells for $4,995.

■ QMS, Inc. (formerly Quality Micro Systems) has a desktop laser printer called Smartwriter. Based on the Canon LBP-CX engine, Smartwriter is compatible with the IBM PC family and all IBM PC-compatibles. Smartwriter boasts some niceties that most other laser printers either do not offer or charge extra money for including support for Qume Corp., Diablo, Epson and American National Standards Institute X3.64 escape sequences, 7 standard fonts, support for parallel interface and reversible image and boldface fonts.

QMS's printer operates at a noise level less than 55 db and provides 300-dot by 300-dot resolution output. Like most of the others, Smartwriter puts out 8 pages/min for up to 3,000 copies/month. The printer comes with an input tray that holds 100 sheets and an output tray that accepts 50 sheets. Two-sided copying can be done manually.

Smartwriter measures 18.7 in. wide by 11.4 in. high by 16.3 in. deep and retails for $3,850.

■

White is a senior writer at Computerworld Focus.

IBM's entry into the laser printer area might occur soon because it has rarely let a profitable market niche escape it.

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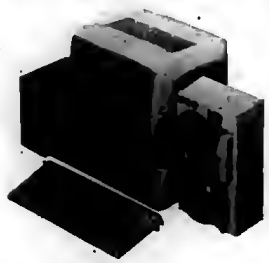

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3270 Emulation: Vendors Bait The Hook

Terminal emulation is here to stay. Vendors are jumping on the 3270 bandwagon and offering alternatives. As a result, more and more users are realizing that terminal care doesn't have to mean staying with IBM.

By Stan Kolodziej

As users and vendors push toward interactive local/host processing, the 3270 market continues to be hot, although IBM Personal Computers and compatibles keep cropping up as a possible alternative. In most cases it's up to management information systems to make the difficult choice.

The 3270 terminal market, despite growing pressure from PCs and compatibles, registered a growth of over 19% in 1984, accounting for unit shipments of over 633,000, according to International Data Corp. (IDC), a Framingham, Mass., market research firm. During the same year, IDC reported the U.S. installed base of 3270 terminals reached 2,882,000. High growth rates are expected to continue through the end of the decade; not bad for an industry said to be teetering on the brink of extinction a few years ago, a market waiting for the PC juggernaut to arrive.

"There is no doubt there will always be a dedicated market for 3270 terminals that will not be touched by personal computers," Greg Blatnick, senior industry analyst at Dataquest, Inc. a San Jose, Calif., research group, explained. "The dedicated terminal users are part of what we call 'terminal heaven,' rows of clerical people performing data entry, order entry and data retrieval tasks for which the stand-alone processing power of the personal computer is not needed. People are surprised

that this dedicated market is still growing and still segmented from the brunt of the personal computer office market."

MIS is being torn in several directions. Users are asking for personal computers for their applications, but the micros have all too frequently proven to be headaches for the MIS department. The 3270 technology is a proven entity with which MIS is familiar.

The 3270 emulation board market for PCs and compatibles is healthy enough, but Ilene Goldman, research analyst at IDC, outlined a number of problems with PC 3270 emulation products that have slowed the full potential for their sales. Problems with file transfer from mainframes to PCs, problems with data security and the annoyance of a PC's memory being suspended until the data exchange between PC and mainframe is finished have taken their toll.

A further drag has been the aggressive 3270 terminal quantity discount pricing thrown in by IBM combined with prices of emulation boards that have remained in the comparatively high range of $1,000 to $1,500. (With good discounts, users can get 3270 terminals for under $2,000.)

According to Blatnick, "You also have to remember that communications with mainframes have been an afterthought with most PC customers. PCs are standalone machines . . . that are only used about 10% of the time. MIS departments know this.

"MIS feels a lot of negatives toward PCs from their experiences of the past few years. PCs are expensive machines that are a hassle to train on and difficult to integrate with each other," Blatnick added.

"The new pressure to integrate PCs with mainframes and get more use from micros is being stalled by some of the negative comments MIS departments have heard about PC emulation boards, local-area networks and other 3270 emulation products. What MIS sees in terminals is familiar: time proven technology, simplicity and attractive pricing. I don't think terminals will make a big dent with established PC users — PCs are part of the American dream of owning your own property and users are stubborn to give them up, but terminals could make some inroads in the new office markets," Blatnick concluded.

Not long ago, the only real alternative to the 3270 terminal was the protocol converter box. Now the alternative 3270 market is varied and includes, along with emulation boards, facilities such as network gateways, local-area networks, advanced cluster controllers, mainframe software and even private branch exchanges. A key factor in the future of the 3270 market, however, rests heavily with IBM — the people who started it all 15 years ago.

A great deal of attention has recently been centered on IBM's Logical Unit (L.U.) 6.2 communications protocol, and for good reason. The L.U. 6.2 protocol could eventually free the IBM mainframe from the role of director of communications access and data transfer between various devices on IBM's Systems Network Architecture (SNA) networks.

MIS is torn in several directions. Micros have often proven to be a headache for MIS, and the 3270 technology is an entity with which MIS is familiar.

The L.U. 6.2 protocol is a completion of the sixth layer (presentation services) of SNA that controls communications among application programs across various devices and communications networks. This type of peer-to-peer communications permits any device supporting L.U. 6.2 to transfer information directly to any device supporting the protocol without the mainframe directing communications access. In addition, the L.U. 6.2 protocol enables micro users to simultaneously request multiple conversations with different mainframe processes. The L.U. 6.2 protocol will replace the master/slave relationship with present 3270 emulation micro-to-mainframe links. Using program-to-program communications, two application programs running on different machines can transfer data no matter what languages are used.

L.U. 6.2 will have repercussions in the 3270 market. Personal computers from any vendor supporting the L.U. 6.2 protocol will be able to talk directly to IBM mainframes without first having to be repackaged to resemble dumb terminals. Micro users will benefit from not having to configure their micros to look like other machines. L.U. 6.2 will also enable micros to access mainframe data without having to disengage its main memory while in a micro-to-mainframe session.

Such a de facto standard could also help MIS departments relieve their mainframes of micro-to-mainframe polling burdens, which have been handled by powerful mainframe software programs. According to Teri Williams, assistant editor at Datapro Research Corp., Delran, N.J., "It will provide MIS with some breathing space to handle other applications."

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IBM has implemented L.U. 6.2 on CICS, the 5520 administration system, and its System/36 and System/38 minicomputers, but it has not yet introduced L.U. 6.2 for its microcomputer line, though Williams thinks IBM could come out very soon with a version within its PC Personal Services software.

The true impact of L.U. 6.2 will probably not be felt in the 3270 market for several years. IBM will gradually test the commercial waters with L.U. 6.2, slowly extending it across its product lines. In any case, IBM has made the L.U. 6.2 specifications open enough to provide hardware and software developers (such as Rabbit Software and others) with ample lead time to incorporate L.U. 6.2 into new products once the expected IBM L.U. 6.2 products arrive. With L.U. 6.2 still in the future, the present battle for the 3270 market remains in the realm of terminals and emulation boards.

IBM will gradually test the commercial waters with L.U. 6.2, slowly extending it across its product lines.

Ron Carlini, vice-president of marketing at Telex Computer Products, Inc., Tulsa, Okla., takes a pragmatic approach to the whole question of 3270 emulation, "Terminals are a low-risk investment in an SNA environment. With billions of dollars in software already embedded in these networks, it isn't cost-effective to redo micros to make them fit the mold."

Despite drawbacks, there are enough pluses with PC 3270 emulation boards to make it a hot growth market. Venture Development Corp., a Natick, Mass., consulting firm, estimated U.S. shipments of emulation boards/communications software totaled 125,000 units in 1984, will reach 283,000 units in 1985 and climb to almost half a million units through 1986.

"Boards will always be attractive because they save users from adding extra coax and an extra footprint," Jim Weber, consultant at PA Computers and Telecommunications, Princeton, N.J., explained.

Even with the presence of major players such as Digital Communications Associates, Inc. (DCA) of Norcross, Ga., and Techland Systems, Inc. of New York City, companies have swarmed into the emulation board market. Like the microcomputer software market, large corporate customers are becoming a little more conservative about which companies they do business with. Sometimes, however, customers have little choice.

"We would have liked to have looked around a bit, but our software applications company in Chicago made it clear that their software only supported one company's emulation board," Peter Santarelli, senior information center technician/network specialist at the New Hampshire Insurance Group, Manchester, N.H., explained. Santarelli's insurance company currently has about 40 emulation boards from CXI, Inc. of Palo Alto, Calif., plugged into PCs that are spread out among the firm's insurance agents and branch offices in New Hampshire.

The CXI Remote Plus boards operate with modems at offices not possessing an IBM 3274 or 3276 cluster controller. Agents can use the boards and modems to dial in remotely through the firm's cluster controller in the Manchester head office and into the IBM 3033 and 3083 mainframes. Software that calculates premiums for various lines of commercial insurance coverage sends the processed data back through the cluster controller into an agent's PC. There, optional software purchased from CXI, called 3278/79 Plus, allows agents to do windowing on their screens for the viewing of one host session and one personal computer session.

In spite of some malfunctioning boards and errant software, Santarelli and his staff are planning to increase their installed board total to 200 within a year (within a total IBM PC and IBM Personal Computer AT figure of 400). They will be used for both remote processing and in-house requirements. For the latter, Santarelli has already begun installing CXI's 3278/79 standard coaxial connection boards that connect directly to the cluster controller. A bonus is the ability of the boards to work with file transfer software designed for DCA's large installed base (estimated at over 150,000 by DCA) of Irma emulation boards. The company has also begun testing some SNA-3270 boards from Pathway Design, Inc. located in Wellesley, Mass.

Santarelli's reasons for staying with emulation boards are fairly typical and sound ones: "Quantity purchase discounts have kept the cost per board well below $1,000, but we also didn't want minicomputer-type applications. We wanted processing power right at the desks of users."

Those companies who have made it to the top of a crowded 3270 emulation board market have usually done so by

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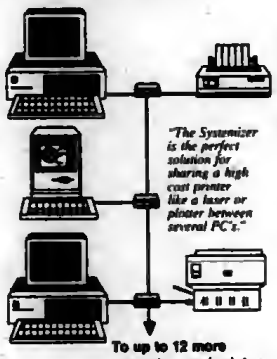
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getting into it early and backing up a good product with good distribution and large quantity discounts. DCA's Barbara Tobias explained, "Board prices over a quantity of 40 or 50 are very negotiable." A DCA distributor added, "We cater to the Fortune 500 companies and usually place 25 to 50 boards in one pop. It's not unusual for us to reach well over 200 boards with a major account over the course of a year."

From an early jump, DCA has never looked back on the success of its PC Irma boards, expanding the line to the IBM Personal Computer XT and PC AT, while keeping in the forefront with new offerings such as the Irmalink/Windows software package that (like the CXI software) allows PC users to display a single host session and a PC session on their screens simultaneously. DCA has just released its Smart Alec interface board that enables communication between PCs and IBM Systems/34/36/38.

"Users are confused with the numbers of [emulation] products out there," Ray Boggs, senior consultant with Venture Development, explained. "Any company that wants to thrive will have to keep expanding their lines. Users are looking for one-stop shopping."

Though AST Research, Inc., Irvine, Calif., is more noted for its success in the expansion board market, its Pcox emulation board has been a success due, in large part, to its multitasking ability that enables a user to run a PC-DOS operation while a 3270 session is running in the background.

Windowing capability and a hot key feature (allowing a user to end one operation, then return to the same spot without logging off) have been major reasons the Blue Lynx emulation board from Techland has been a close competitor of the Irma board. Techland has also been busy expanding its line of emulation products with remote 3270 emulation, its 3270 Gateway product for IBM PC Network users and a product that will compete directly with DCA's Smart Alec for the growing 5251, 5291 and 5292 terminal emulation market.

3Com Corp., a maker of local-area network products out of Mountain View, Calif., has recently released its Ether3270 gateway software that allows PCs attached to 3Com's Etherseries local-area network to emulate 3270 terminals. To handle several such PCs, 3Com has devised a method whereby one of the PCs on the network or the company's new 3Server file server are equipped with IBM Synchronous Data Link Control (SDLC) cards and a synchronous modem enabling them to function as 3274 cluster controllers. Cost is about $1,500 per server.

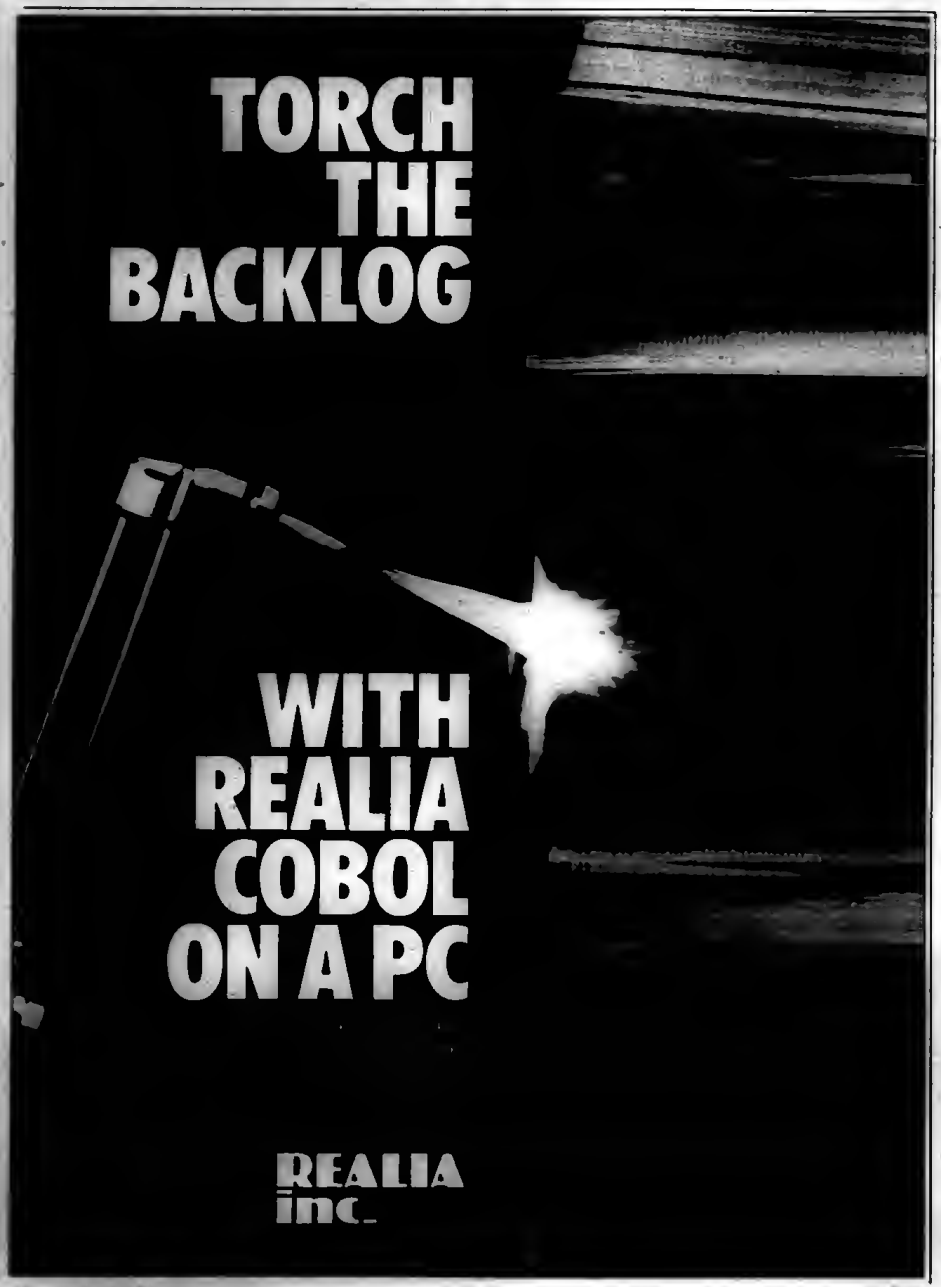
A maker of departmental computing systems, Motorola/Four Phase Systems of Cupertino, Calif., is scheduled to introduce its Mainline product in early 1986. Mainline, according to Dennis Donahue, senior product marketing analyst at Four Phase, will enable a user to extend 3270 communications not just within the traditional single mainframe limitation, but with up to eight IBM mainframes, while also providing "programmatic communications control" among the mainframes from the user's PC. Mainline is not priced at this point, but Donahue said it will be supporting the company's Vision-Linc software ($3,500) that enables 3270 emulation users to access the Vision line series of data base management programs running on the company's Series 4000 and 5000 computers.

Those at the top have gotten into it early and backed up a good product with good distribution and large quantity discounts.

Winterhalter, Inc., Ann Arbor, Mich., has been beta testing Datatalker 2, a new version of its 3274/76 emulation controller. On the surface, Datatalker 2 represents an enhanced controller offering the kind of value-added features that should prove attractive to those interested in 3270. According to Don Redding, Winterhalter's vice-president of product development, Datatalker 2 will come bundled with the following: Applications Program Interface (API) that allows a user to integrate 3270 emulation directly into an applications program; Quickscreen, a program for reducing line traffic; Calctran, a file format conversion program; and File Transfer, a program for IBM CMS and TSO environments. "It's now a question of bundling in more than the next guy," Redding explained.

Mainframe-based software is also becoming more inventive. A new package called 3270-Plus from Rabbit Software takes advantage of the multitasking features of the Unix operating system to emulate a 3274 controller as well as IBM's device-specific L.U. types.

The package includes a module called Program Interface Module (PIM) that permits direct application program-to-application program communication between a microcomputer and a mainframe.



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John Doherty, Rabbit's president, has classified PIM as a forerunner of IBM's much anticipated L.U.-type 6.2 protocol.

"Even private branch exchanges are beginning to offer 3270 and Ascii conversion technology," Goldman at IDC said. "The alternative market is small, but users who have been grabbing at anything now have more than enough alternatives to wait and be selective."

The 3270 terminal market takes up the lion's share of the 3270 world, making up almost 70% of the total market in 1984, according to IDC. Within that segment, IBM's share is placed conservatively at anywhere from 60% to 70%. Far down the earnings column comes Telex (about 10%); followed by ITT Courier Terminal Systems of Tempe, Ariz., (about 7.8%); AT&T Teletype of Skokie, Ill., (5.7%); and Lee Data Corp. of Eden Prairie, Minn., (3.7%). (These are IDC's 1984 figures, but Goldman said there is little reason to believe they will significantly change in the near future.)

While the 3270 terminal market is robust, it is not manna from heaven for all players. Besides IBM, only Telex registered a good 1984, according to IDC, but it too is feeling the effects from a recent series of IBM price slashing and new product announcements such as the 3179 and 3179 Model G, the 3180-1 and 3180-2 and the 3161 and 3163 Ascii terminals — all of which are departures from IBM's mainstay 3278 line.

Goldman said IBM's strategy, at least in the short-term, seems clear: Keep offering low-cost, low-profile terminals and deliver them quickly, introducing some value-added features (such as graphics) that until now have been the responsibility of the so-called plug-compatible manufacturers (PCM) like Telex and Lee Data. PCM are trying to keep out of IBM's destructive path. Telex, which Goldman said possesses an excellent marketing force and good timing for new product introductions, has introduced its new 078 and 079 12-in. screen terminals at prices Carlini said "reflect our work and success at keeping production cost curves down."

ITT Courier has taken a different tack with the introduction of its Applications Processor, a microcomputer system packing an Intel Corp. 80286 microprocessor and capable, the company said, of providing ITT 9200 terminal users with standard 3270 host communications. It also comes bundled with Q-Office word processing software and Intel's Idis spreadsheet and data base management programs. ITT Courier, in effect, has created an enhanced 3274 controller full of value-added material to help solidify its customer base.

AT&T also means business. It is leveling its sights and taking aim at IBM with three just-introduced families of 3270 terminals and a cluster controller (see In the News, Page 10). AT&T will market its terminals in configurations of eight or 16 terminals, a controller and two printers, starting at $41,000.

Its high-end 6538 and 6539 terminals will feature windowing, handling four separate and concurrent asynchronous/synchronous sessions with a top-of-the-line terminal price of $2,890. Ken Kampa, responsible for product planning and product management of the synchronous product line at AT&T, said, "The new product line has been developed to achieve a high presence in the commercial marketplace."

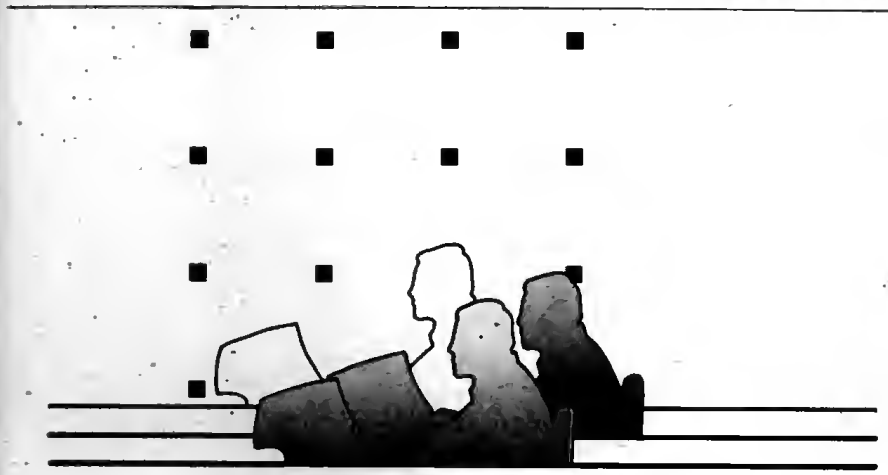
The real future of the 3270 market, however, lies with IBM.

The real future of the 3270 market, however, lies with IBM. Besides the L.U. 6.2 protocol, there are other possibly imminent product announcements from IBM that could alter the outlook of 3270. IBM has been rumored to be on the verge of introducing a new 3274 cluster controller that industry watchers say could support up to 64 devices, provide multiple port connections to the host(s), local-area network connections, wide-ranging terminal support (for example, PCs, voice data, Ascii, 3270/PC as well as 3270) and hard disk storage.

IBM's garden of PC products, many of which sport built-in 3270 communications, is a confusing array of family products. Currently, within the 3270 micro family alone, there are AT 3270, AT 3270 Model G and AT 3270 Model GX and the 3270 PC series. Resulting confusion has probably made the third-party emulation board and software markets more attractive to PC users.

■

Kolodziej is a senior writer at Computerworld Focus.



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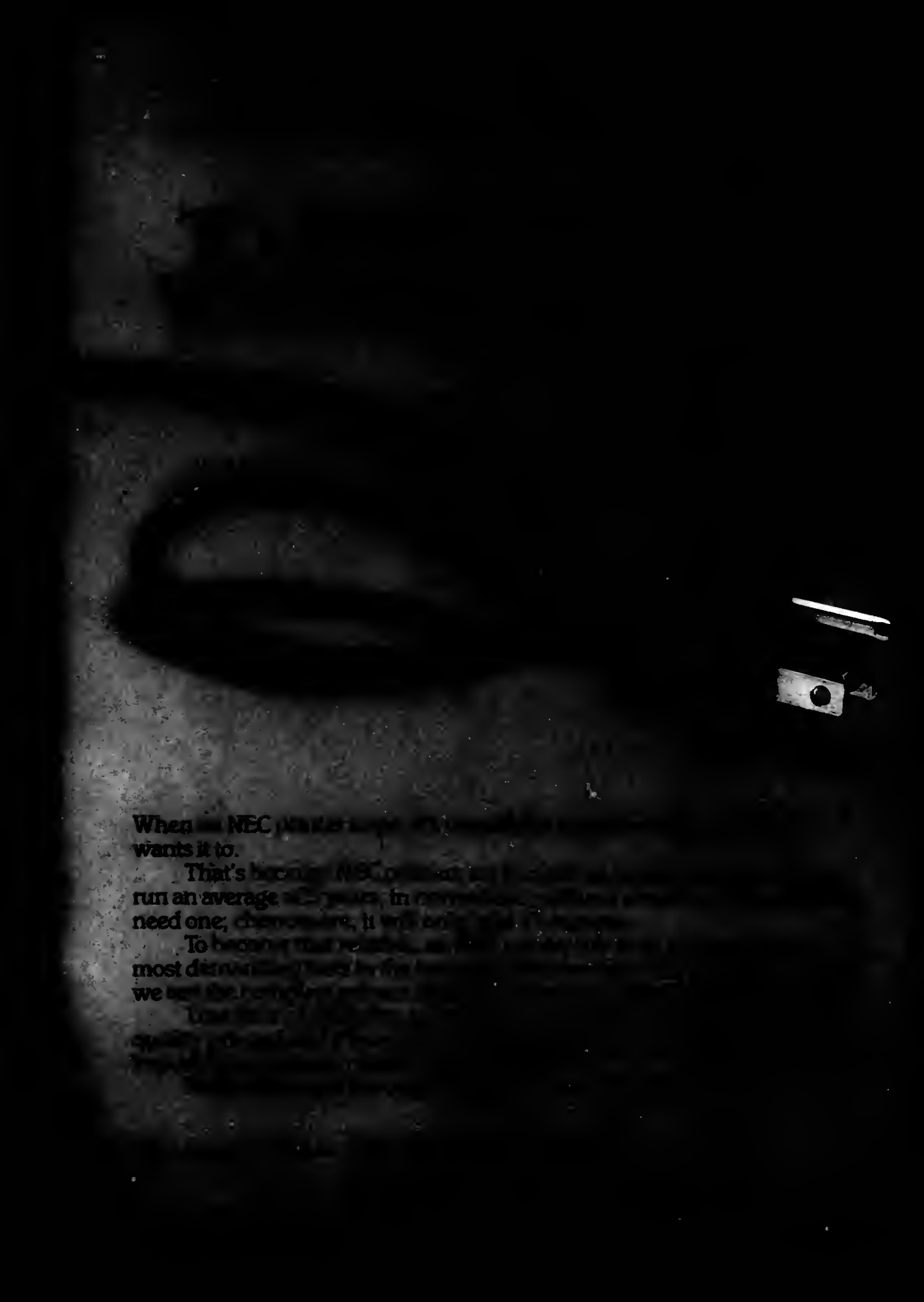

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MORE IS BETTER

IBM PC add-on boards are still selling, but a hot PC AT market is spelling expansion relief for more micro users. What kind of variety and power are add-on board vendors offering for those who want more byte in their machines.

By Stan Kolodziej

Not very long ago, vendors of add-on boards for IBM Personal Computers and compatibles were a concerned bunch.

The good news had IBM coming out with a new microcomputer, but the bad news had Big Blue supplying it with so many built-in features that the add-on market could be frozen out, stuck instead in a crowded PC board market.

The fears proved unfounded. When the IBM Personal Computer AT finally appeared last year, relief was evident. IBM had left the AT wide open for third-party board vendors to create a new market.

Though the AT has been out for over a year now, sales of multifunction and expansion boards for the AT and its growing list of compatibles have been slow in getting up to speed, due in large part to early problems with the AT's disk drives and IBM's hesitation, until recently, to ship in large volumes.

No matter. Board sales for the IBM PC and its compatibles are still climbing. Tim Riggins, an analyst at Future Computing, Inc., Richardson, Texas, placed unit sales of both PC multifunction and expansion boards at 1.7 million in 1985, representing $700 million in sales. That's up from 1 million unit sales and $415 million in 1984. By 1987, Riggins predicted over 3 billion PC boards will be sold and the market will reach $1 billion.

Not everyone, however, sees a rosy PC add-on board market. "The add-on board business will be in a precarious position because of the growing differences between cost and retail prices," Aaron Goldberg, director, micro advisory services at International Data Corp. (IDC), a Framingham, Mass., research group, explained.

As with so many maturing markets, the PC add-on board market, although only four years old, is being dominated by a few major vendors taking in the yeoman's share of revenues. "About five companies have 85% to 90% of the market," Riggins explained, "with AST Research, Inc., [Irvine, Calif.] the big player." Future Computing's survey of computer retail stores showed that AST Research's Sixpack Plus IBM PC multifunction boards were outselling other boards by a ratio of about five to one. AST Research was said to have reached the 500,000 board installations number, and Riggins calculated that the company could account for up to 45% of multifunction board sales.

Others that are running at the heels of AST Research include Tecmar, Inc., Solon, Ohio; Quadram Corp., Norcross, Ga.; Persyst/Emulex Corp., Costa Mesa, Calif.; and Hercules Computer Technology, Berkeley, Calif.

Multifunction boards are generally distinguished from expansion boards by the number of functions they provide. An expansion board usually concentrates on providing a single personal computer feature such as graphics or memory expansion, while multifunction boards can put several features on a single add-on board.

A multifunction board, for example, could plug into an AT and provide additional memory up to 1M byte or 2M bytes (user-expandable through 64K-byte and 256K-byte chip increments), a parallel printer port, two asynchronous RS-232C communications ports and an optional game port for graphics. All of these features are packed onto one board that only requires one AT expansion slot and costs less than $600 in today's marketplace. For under $250, however, a user can also buy a single-purpose board that can hike an IBM PC's memory up by 256K bytes.

The most popular features of multifunction boards include memory expansion, internal clock and input/output functions. Other features might include graphics and color capabilities for IBM monochrome monitors, built-in modems, print memory buffers, disk emulation for pseudo memory expansion, security lock-out features and sometimes even bundled-in software. For example,

AST is bundling Borland International, Inc.'s Sidekick program into its Sixpack Plus multifunction boards, and Tecmar has long included its Treasure Chest software package with its top multifunction boards.

The IBM PC is a natural promoter of what is termed the add-on board aftermarket. The PC's processor speed was slow even for 1981 microcomputer standards. Now its 4MHz Intel Corp. 8088 processor seems excruciatingly listless when not employing coprocessors built into add-on boards and designed to increase the 8088's speed. Most software today needs far more than the basic 64K bytes of memory the PC provides. Again, memory add-on boards can remedy the problem.

To aggravate matters, the IBM PC is a computer not easily integrated with printers and other peripherals, while its own color adapter handles only four colors. In fact, if users want to handle sophisticated software, statistical processing, increase memory and storage, do color graphics or add some data security, they will probably go to expansion and multifunction boards.

Add-on boards are also now packing enough power and features to make management information systems stand up and take notice. Motorola, Inc., Phoenix, Ariz., for example, has just introduced an IBM PC expansion board that it claims allows a PC with a 10M-byte hard disk to serve as a multiprocessor host for AT&T Unix applications. The PC/68000 includes the 10-MHz Motorola 68000 microprocessor, cache memory, 2M-byte dual-ported random-access memory along with bundled proprietary Motorola System V/68 operating system. At $4,500, it doesn't come for a song, but it gives an idea of how single board advances are offering to extend the use of IBM PCs in corporations.

Despite the PC's inherent limitations, IBM's reputation carried it to success, and the market for add-on boards followed in the jet stream. Riggins maintained, "the PC ironically created thriving aftermarkets based on its own inadequacies." It's a symbiotic marriage that works: The IBM PC created the add-on board market, and that same market is prolonging the life of the PC, even extending the PC's reach into previously exclusive and hostile areas such as laboratory testing and industrial process control.

The add-on board market, however, is getting crowded. Datapro Research Corp., a market research firm in Delran, N.J., reported that the number of current add-on board vendors supplying the PC, AT and compatibles market could be as high as 250 in the U.S. That figure does not include the growing number of offshore companies, primarily based in the Far East, that are using off-the-shelf components and cheap labor to unload board clones in the U.S. market, undercutting prices of established U.S. board makers. In retaliation, U.S. firms have begun taking representatives of these offshore companies to court for patent infringement and have issued warnings to consumers about the lack of service and warranties backing these imported boards.

"More board companies will go with proprietary technology to head off those companies putting standard components on boards, bundling them with software and selling both for slightly more than the retail price of the software," said Goldberg at IDC.

Despite crowding, the board market does seem to leave room for innovation. At a recent PC Expo show, for example, a number of vendors displayed PC expansion and multifunction boards offering power and features not available even a year ago. One unusual multifunction board is the Modem Accelerator from Datran Corp., Los Angeles, Calif. The company said the Modem Accelerator is a microprocessor oriented toward human language. The board uses a read-only memory-based dictionary containing 28,000 words and 4,000 phrases. The command Compress Filename compresses the text — using a 5-bit assignment logic instead of Ascii — to one third its original size. When this is completed, the board's accelerator transmits data at three times the normal speed of the modem, while another modem accelerator at the other end decompresses the data.

Single purpose boards are also finding room for some unconventional features. The PC-Elevator from Applied Reasoning Corp., Cambridge, Mass.; places an Intel 80286 chip on a plug-in board, adds some proprietary software along with 2M bytes of random-access memory to produce what the company called a "softboard" that lets the PC or IBM Personal Computer XT run AT applications under a DOS 3.0 or 3.1 environment. Applied Reasoning claims the board increases the speed of the PC to 50% faster than the AT, while allowing existing PC programs to be run without change.

Another example of board ingenuity is Hardcard from Plus Development Corp., Milpitas, Calif., which offers a 10M-byte, 3½-in. Winchester disk drive that has been eased to fit on a single PC add-on board. The company claims it comes complete with electronics, controller and file management plus "one time installation software."

The market for add-on boards is also becoming more complicated with the recent introduction of some vendor standards that their promoters hope will become de facto standards, helping to stabilize the market and increase profits in the bargain. Last April, Lotus Development Corp., Cambridge, Mass., and Intel

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Corp., Santa Clara, Calif., came out with extended memory specifications (EMS), a way to extend memory beyond the 640K-byte DOS 3.0 limit. Shortly thereafter, Microsoft Corp. of Bellevue, Wash., joined the Intel/Lotus team to create EMS 3.2, another version of the standard. Not to be outdone, AST Research, Quadram Corp., and Ashton-Tate, Culver City, Calif., have joined forces to push their own EMS into the market.

Expanded memory, which used to be known as bank-switched memory, allows applications to use memory beyond the built-in limitations of the machine's microprocessor. Bank-switching fools the processor into thinking it has more memory by quickly switching back and forth among memory banks once a bank's capacity is reached.

Whose standard will prevail? "Given that IBM and Microsoft have linked up or are going to continue to work together, I think that what will come out of that relationship will determine what the hook is to extended memory specs," Goldberg declared. "For all Intel and Lotus or AST and Quadram want to make it, IBM and Microsoft will tell you how it really is."

Add-on boards supporting the Intel/Lotus EMS specs are just now starting to appear on the market. The Memory-Companion/PC board, for example, from STB Systems, Inc., Richardson, Texas, offers bank-switching capability for PCs, XTs, ATs and compatibles. STB Systems claimed the board provides up to 2M bytes of memory for software programs using the Lotus/Intel EMS. AST Research has also introduced a board called Rampage that uses an enhanced superset of EMS, which the company claims is more flexible than the specification itself.

"If [board] companies don't incorporate Lotus/Intel memory specs from here on," Bill Weber, consultant at PA Computers and Telecommunications, Princeton, N.J., concluded, "they're going to meet a lot of market resistance. There's also going to be big pressure on software companies to provide programs taking advantage of the extra byte space provided by EMS and the board makers."

EMS relies on sleight of hand programming to increase memory, but it can do nothing to increase speed, which will also be a requirement to fully use EMS. A number of add-on board companies are filling niches aimed at users who need to take their existing PCs and XTs into the same speed lane as the AT, without paying the AT price tag.

These so-called accelerator or turbo boards are generally single-purpose expansion boards packing a high-speed coprocessor — usually an Intel 8086, 80186 or 80286 — and additional memory chips. Some of the boards also manage to find room for the Intel 8087 math coprocessor, which gives the computer that much more clout with applications carrying heavy number crunching.

An example is Quadram's Quadsprint, a board featuring a 10MHz Intel 8086 coprocessor along with 4K bytes of cache memory that acts as a memory buffer to speed system throughput.

Although IDC predicted only about 30,000 of these accelerator boards will be sold in 1985, the $1,000 to $2,000 price range is attractive enough for value-added resellers and original equipment manufacturers to plug them into PCs and XTs, bundle or customize vertical application software and market it to the thriving professional and departmental computing markets. (Accelerator boards are finding a solid base of users in the financial community where business analysts need the extra speed for handling quick calculation and recalculation of financial statistics.)

"The AT has really made PC users aware of how slow the PC is," Weber explained. "Accelerator boards will make the transition to the future generation of very fast personal computers a little easier."

"For all Intel and Lotus or AST and Quadram want to make it, IBM and Microsoft will tell you how it really is."

As for a logical limit to the number of features multifunction boards can provide on a single add-on unit, both development costs and user resistance will probably act as a drag on the development of true all-in-one boards. To begin with, estimates can place the costs of doubling the features of a multifunction board to several hundreds of thousand of dollars. In any case, users might not be that anxious to purchase all-in-one boards should they appear.

According to Riggins, "Quadram is a prime example of a company trying to get more functionality on their boards without real success. Their attempt, for example, to increase sales by incorporating graphics on their Silverquad and Goldquad multifunction boards is not paying dividends. There is a point of diminishing returns.

"People still want simple attributes, although they do want more than just

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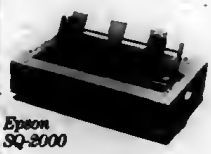

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memory expansion. Surveys indicate a user probably wants something like a good, dedicated graphics board than something integrated with software programs such as Symphony [Lotus Development Corp.], and perhaps packing other features," Riggins concluded.

After its slow start, the AT aftermarket is gaining momentum, but opinions vary as to its exact health. Riggins at Future Computing predicts a much tougher AT market for add-on boards, already stalled slightly from IBM's recent introduction of its own AT graphics adapter.

"There's no question that the AT market will require board companies to produce devices with more functionality than ever before," Riggins concluded. "The IBM PC experience has made compatible makers better prepared, both in technical terms and in marketing, this time around with the AT. Users are also more sophisticated. AT board makers will have to be in a position to bring something better than what the AT compatible makers are bringing to market, and that will require a lot of resources. The AT aftermarket won't be for the little guy."

Datapro has tallied at least 50 current AT add-on board makers and found that most carry a broad line of products rather than one or two. Expansion of product line seems to be the rule for survival. In the Datapro survey, 60 companies accounted for 300 board products, an average of five boards per company. "From the start we knew we had to be more than a one product company to succeed in this business," Martin Alpert, president of Tecmar, said.

Though the swing seems definitely toward the AT and compatible market, Future Computing's survey of over 600 U.S. retail outlets found that only the Advantage multifunction board from AST Research was meeting sales expectations in the AT add-on market.

Board vendors are hoping, however, that more users like the Cleveland Clinic will find the extra processing punch the AT commands over the IBM PC irresistible. The Cleveland Clinic, a research hospital in Cleveland, Ohio, has been busy removing its Burroughs Corp. B20 and B30 workstations, replacing them with 200 ATs over the course of the next year. Part of the plan involves using Maestro AT multifunction boards from Tecmar, 40 of which have already been installed.

A spokesman for the clinic explained that although the Burroughs machines handled multiuser processing they lacked adequate third-party software. "There are only 256K bytes on the ATs delivered from IBM," he said, "so we're getting some extra memory up to 1M byte per machine. We want to be ready when the new generation software [based on EMS] appears."

The Maestro boards provide two memory blocks. The first block upgrades the AT to a maximum of 640K bytes, the maximum amount of memory usable by DOS 3.0. The 640K-byte capacity provides enough memory for most of today's popular programs such as Lotus' 1-2-3 and Symphony. The second block can upgrade memory to 2M bytes through the use of 64K-byte and 256K-byte chips.

Tecmar maintained that this additional memory could be employed in multiuser environments running multiuser operating systems such as AT&T's Unix and Microsoft's Xenix. Maestro's built-in extras include one serial and one parallel port along with its Treasure Chest package of 24 software modules, which it bundles free of charge. A Maestro board with a base 128K bytes costs $589; climbing to 2M bytes using 10 256K-byte chips will run nearly $4,600.

AST Research's Advantage board, apparently the early leader in the AT add-on market, features three banks of 18 sockets for memory chips on its main circuit boards and an additional three banks on a daughter board. With its two levels loaded to their capacity, the user has over 3M bytes of memory. The board comes with standard serial and parallel ports and has a base price of $595.

Other board makers that are serious contenders for the AT market are STB Systems with its Grand Byte board that starts at $395 and goes to over 2M bytes and Sigma Designs, Inc.'s Maximizer board that also goes to beyond 2M bytes and has a base price of $549.

AT board vendors offer memory expansion in controlled increments, mainly because as yet there is little software available that can fully use 640K bytes of memory, let alone 1M byte. With gradual memory expansion, users can increase memory to coincide with the arrival of the newer programs requiring ever greater chunks of RAM.

Also, prices of memory chips are falling. The prices of 64K-byte chips might even have hit rock bottom, some analysts say, making the continuing price reduction of 256K-byte chips even more attractive. Many corporate users will no doubt wait further, hoping prices will plummet even more.

Though overall the future of the aftermarket for IBM PC and especially the AT looks bright, vendors are beginning to worry again. The much anticipated PC2, or next generation of IBM PC, is haunting many vendors. Again, it's the specter of closed architectures and too many built-in features.

"They'll always be room for worry here," Weber of PA Computers explained. "It's part of the business."

■

Kolodziej is a senior writer at Computerworld Focus.

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Supermicros: Solution In Search of A Problem

The price of computing power is coming down. At the same time the memory gets fatter, speeds race higher and operating systems become more compatible. Soon there may be a chicken in every pot and a supermicro on every desk.

By Lee White

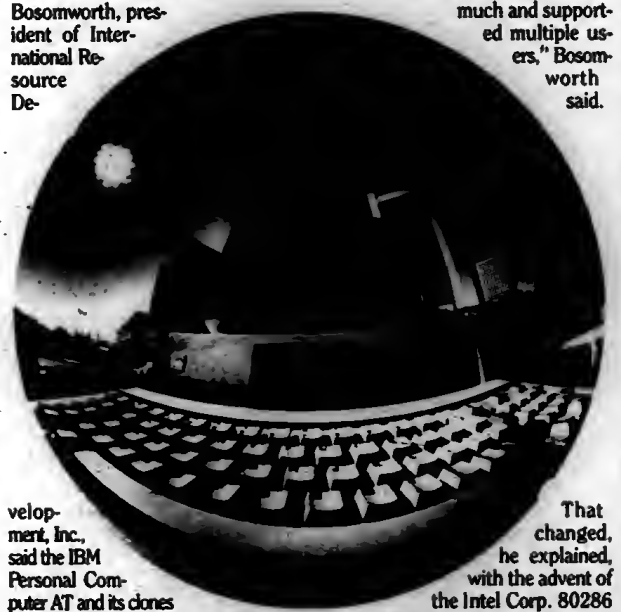
Figuratively speaking, what's gray and fuzzy and resides in limbo? Why, the supermicrocomputer, of course.

Although the supermicrocomputer is not in widespread use in U.S. corporations and is only slightly more visible in the academic and scientific communities, this may change soon. Industry watchers agree that within the next few years the supermicrocomputer will have a significant impact on the computer hardware market and an even bigger impact on the traditional MIS department.

What the experts don't agree on, however, is the definition of supermicrocomputer. Larry Lefkowitz, associate editor of the microcomputer group at Datapro Research Corp., defined the machine as "something more than a microcomputer and something less than a minicomputer."

The supermicro is more a marketing distinction than a technical one, according to Tim Caffrey, director of Strategies for Microcomputers and Office Systems at International Data Corp. in Framingham, Mass. The supermicrocomputer, Caffrey said, "is a microprocessor-based system, but the microprocessor is powerful enough and the operating system so designed to support more than one user. It can be a shared logic system, comparable to a minicomputer. That's sort of a marketing distinction, to separate it from a personal computer."

How important is such a definition, anyway? Kenneth Bosomworth, president of International Resource Development, Inc., said the IBM Personal Computer AT and its clones cannot be compared to the Altos Computer Systems, Inc. and Fortune Systems Corp. systems and added that a definition of supermicrocomputers is not as useful or meaningful as it used to be. "Before machines like the [IBM PC] AT came out, there was very definitely a dividing line between what people knew as a single-user personal computer and what usually cost three, four or 10 times as much and supported multiple users," Bosomworth said.



GEOFF O'CONNELL PHOTO

That changed, he explained, with the advent of the Intel Corp. 80286 and Motorola, Inc. 68000 microprocessors, which made personal computers so powerful that they melded into the supermicro arena.

The dividing line between personal computers and supermicrocomputers may occur in relation to microprocessor power and operating systems like Bell Laboratories, Inc.'s Unix and Microsoft, Inc.'s Xenix that allow for multiple users. But the division between supermicrocomputers and minicomputers also appears to be fuzzy. Jim Renalds, industry analyst with Dataquest, Inc. said that supermicrocomputers are generally based upon nonproprietary processors like those made by Intel, Zilog, Inc., Motorola or National Semiconductor Corp. Furthermore, Renalds said, supermicros support a limited number of users, while the typical minicomputer supports anywhere from 30 to 200 users; and the storage capabilities of supermicros run from 20M bytes to 200M bytes, while minis can reach 1G byte or 2G bytes.

Using Renalds' definition, Digital Equipment Corp.'s Microvax II fits into the minicomputer category. Microvax uses DEC's own 78032 processor, its own operating systems (MicroVMS, Ultrix-32M and ELN) and offers a maximum 2G bytes of storage. Yet all the industry experts and DEC spokespeople call the Microvax a supermicro.

Another machine that does not fit Renalds' definition, but is indeed a supermicro, is the IBM System/36 PC. While the standard System/36 is a minicomputer, the

System/36 PC uses the IBM 5364 processor, an IBM proprietary operating system (System/36 System Support Program) and can support four local workstations, including the attached PC, systems printer and any combination of two PCs, printers or System/36 displays. In addition, up to 64 remote workstations can be attached.

While exceptions seem to be the rule when it comes to defining a supermicrocomputer, for the purpose of this article a supermicrocomputer is defined as a 16- or 32-bit microprocessor-based computer that runs an operating system capable of supporting more than one user and has an entry-level price less than $20,000.

Before a great hue and cry enters the stratosphere at the $20,000 cutoff price, it is necessary to define the audience. There are millions of microcomputer users in small- and medium-size companies and in departments within large companies who have either outgrown their micros or now find a need to communicate with other microcomputers in their companies or departments. In the case of small companies, $20,000 is a very steep price. In the case of departments within large companies, $20,000 is hard to justify when there may be multiple multimillion dollar mainframes for the using. It is for these reasons that supermicros like the Altos 3068 with a minimum configuration price of $23,490 are excluded.

The above definition also precludes including some very strong players in the supermicro market, notably the Compaq Computer Corp. with its Compaq Deskpro 286. Although it has the Intel 80286 chip, runs at 8 MHz, can be configured with 8.2M-byte random-access memory and 70M-byte hard disk storage, a spokesman for the company said Compaq does not support Xenix (although Xenix does run on the 286). Until such time as Compaq considers Xenix a viable operating system, there is no multiuser capability.

For the same reason, Corona Data Systems, Inc.'s Mega PC is not included. Although literature stated Mega PC supported up to eight users, Microsoft, Inc.'s MS-DOS is the only operating system; therefore, the box is acting as a file server only.

The technical specifications of the supermicros within our definition appear in chart form (see Figure 1, Page 46). Of more immediate interest, however, is the impact of the supermicro in the marketplace.

According to a survey performed by Dataquest, in 1984 worldwide shipments by U.S. vendors were 230,000 units at an average of $18,000 per system (including printers) for a total dollar value of $4.2 billion. The estimate for 1985 is 295,000 units totaling $5.4 billion, again with the average cost per system of $18,000. Dataquest forecasts a 28% annual growth rate with the price per system staying the same, but the price/performance ratio rising. The 10 vendors who were 1984 leaders in the supermicro market were Burroughs Corp. (13%); Altos (5.8%); NCR Corp. (4.2%); Televideo, Inc. (4.2%); Fortune (3.3%); Tandy Corp. (3.0%); Compupro, Inc. (3%); DEC (2%); Molecular Computer Corp. (1.8%); and Cromemco, Inc. (1.8%). The total market share of these leaders is 42.1%, leaving 57.9% of the market share to 165 different vendors, according to Dataquest.

With 175 vendors in the supermicro market, some of which tout entry-level prices that hover around $5,000, there is little doubt that the era of the no-frills personal computer is coming to an end. Luanne Kruse, an analyst with Future Computing, the Dallas-based market research company, stated that office personal computers will increase in power and performance and bump up against the supermicros.

Supermicros will play a significant role in the hardware market, according to Harvey L. Poppel, partner in Broadview Associates, the Fort Lee, N.J., merger and acquisition firm specializing in the information industry. "[The supermicro] changes the competitive dynamics of who's got what position. In some respects, you can think

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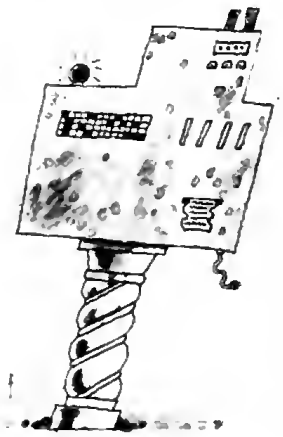

CW Communications, ComputerLand and The Computer Museum invite you to send in your early personal computers, software, and memorabilia — you could win a free trip to The Computer Museum in Boston

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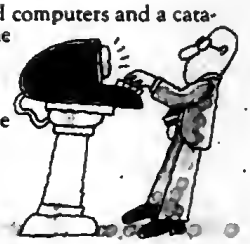

ComputerLand, CW Communications, and The Computer Museum are working together to bring these early relics out of your attic and into the collection of The Computer Museum. The museum is especially looking for kit machines, prototypes, programs, output, newsletters and memorabilia of early computing from around the world. A selection of the finest items will be used to create an exhibit on the evolution of personal computers and a catalog highlighting the Museum's collections. If your submission is accepted for addition to the Museum collection, you will be invited to the grand opening of the exhibit and will receive a bound edition of the catalog. If your item is selected as one of the five best "finds", you will also receive an all-expense-paid trip to Boston for the grand opening party.

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Entries will be judged on significance, rarity, date, completeness and condition. Items particularly sought include pre-1980 machines, early serial numbers (get those number 1's out), machines made for purchase outside of North America (even modern machines are sought in this category); first releases of software such as first releases of operating systems, languages and mass-marketed and original applications; and pre-1980 photographs, newsletters, manuals and other records. The Computer Museum is a private non-profit educational institution. All donations are tax-deductible according to the provisions of the Internal Revenue Service. Thinker Toys is a registered trademark of George Murrow & Murrow Designs, Inc.

of the supermicro as the collision ground between the micro suppliers and the mainframe and mini suppliers," Poppel added.

According to Kruse, Future Computing believes that the winners in the supermicro market will be based on the IBM PC AT's Intel 80286 processor, for the same reason that the winners in the micro market were all IBM PC compatible. "We think the machines are going to be making that switch to the 80286. We've just seen the announcement of the Hewlett-Packard Co. Vectra and the Sperry Corp. PC/IT. We think in a couple of years' time they [80286-based computers] will be the center of the marketplace and could represent 50% to 75%," Kruse said.

Along with the impact of the supermicro on the marketplace, there will definitely be an impact on the corporate MIS department. Broadview Associates' Poppel sees the rising popularity of the supermicro as a continuation of the trend toward making more power immediately accessible to the end user. He explained that this power exists not only in the microprocessor, but also in the downward compatibility of the machines, citing as an example DEC's Microvax II with operating systems and applications and data base management software written for much larger systems.

How will this affect the MIS director and the often huge MIS department? Poppel stressed that the evolutionary trend toward more power on the end user's desk will continue to erode the role of the MIS executive as controller of a company's computing capabilities. "This [advent of the supermicro] enables vendors to sell directly to end users who are becoming more and more literate and capable of developing their own applications. This will allow users to get out from under whatever bottlenecks they may perceive to exist in the central site, either from a systems development point of view or a hardware point of view," Poppel said.

But it's not all doom and gloom for the MIS executive and staff. According to Christine Steitz, senior analyst with Infocorp, a computer market research firm in Cupertino, Calif., a lot of the old traditional MIS power was usurped by the hailstorm of personal computers. Steitz stated that in the beginning MIS recoiled from the horror of the personal computer age. However, these same MIS professionals are now taking control of personal computers and departmental computers, too.

What role will the MIS department play in the future of corporate computing. "I don't happen to think [the MIS role] is to run central data centers or to control all systems development in the company," he said. Instead, Poppel sees the overall management and networking of all the systems in the company as the primary future function of MIS. While "all the things that MIS directors were originally very proud of and built their empires around [will become] less important," Poppel asserts that the enlightened MIS director will not be threatened by the increasing end-user computing power and the resulting decrease in central computing power.

Poppel's sentiments were echoed and expanded upon by John Connell, executive director of the Office Technology Research Group in Pasadena, Calif. Connell maintained that small systems management, whether the systems are stand-alone personal computers, supermicros or minis, should be in the hands of user departments.

Although the MIS organization gives up a certain amount of control to end-user departments, the MIS staff is able to concentrate on the large data base management systems, the heavy transaction processing systems, the network management activities. "I think in the long haul it's good for the industry and it's good for the profession because you take high-powered people with their graduate degrees in computer science and you put them to work on the most complex difficult aspects of the field, and you let the amateurs, the part-time users, do their own thing."

■

White is a senior writer at Computerworld Focus.

Vendor Model	Microprocessor Operating Speed	Operating System	Maximum No. of Users	Minimum Configuration RAM	 Hard Disk	Maximum Configuration RAM	 Hard Disk	Minimum Configuration Price
Altos Computer Systems, Inc. Model 2068	16/32-bit Intel 80286, 6 MHz	Xenix	30	1M Byte	50M Bytes	8M Bytes	240M Bytes	$14,990
AT&T Unix PC	16/32-bit Motorola 68010, 10 MHz	Unix V	9	512K Bytes	10M Bytes	2M Bytes	20M Bytes	$ 5,095
AT&T 382/300	32-bit Western Electric 32000, 7.2 MHz	Unix V	25	512K Bytes	10M Bytes	2M Bytes	72M Bytes	$ 9,650
Convergent Technologies, Inc. Miniframe	16/32-bit Motorola 68010, 10 MHz	Unix V	16	512K Bytes	13M Bytes	2M Bytes	170M Bytes	$ 6,600
Digital Equipment Corp. Microvax 6	32-bit DEC 78032, 20 MHz	MicroVMS Ultrix-32M, ELN	30	2M Bytes	31M Bytes	5M Bytes	2G Bytes	$20,000
Fortune Systems Corp. FS 20	32-bit Motorola 68000, 6 MHz	Unix V	5	512K Bytes	20M Bytes	1M Byte	20M Bytes	$ 6,995
IBM Personal Computer AT	16-bit Intel 80286, 6 MHz	PC-DOS Xenix	3	512K Bytes	30M Bytes	3M Bytes	80M Bytes	$ 5,995
IBM System/36 PC	16-bit IBM 5364	PC-DOS 5364 System Support Program	4	256K Bytes	40M Bytes	512K Bytes	80M Bytes	$ 5,995
Intel Corp. 286/310 AP	16-bit Intel 80286, 6 MHz	MS-DOS Xenix	16	1M Byte	40M Bytes	2M Bytes	140M Bytes	$11,200
Motorola/Four-Phase Systems, Inc. Series 2068	16/32-bit Motorola 68010, 10 MHz	Unix V	12	512K Bytes	52M Bytes	2M Bytes	369M Bytes	$12,495
NCR Corp. Minitower	16-bit Motorola 68010, 10 MHz	Unix V	6	512K Bytes	25M Bytes	2M Bytes	85M Bytes	$ 6,495
Sperry Corp. PC/IT	16-bit Intel 80286, 6 MHz	Xenix V	9	1M Byte	44.6M Bytes	5M Bytes	89M Bytes	$ 6,834
Texas Instruments, Inc. Business-Pro	16-bit Intel 80286, 6 MHz	MS-DOS Xenix	50	512K Bytes	21M Bytes	3.5M Bytes	40M Bytes	$ 5,795

† Operating Speed Data Unavailable

Figure 1. Sample of Multiuser Supermicrocomputers Under $20,000

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Hooking Up With the Mainframe

How to best link micros to each other and to mainframe equipment is probably the most asked question by MIS managers today. Here's a down-to-earth look at what's available and what devices to use when.

By Charles G. Teets

In the confusing world of the micro-to-mainframe marketplace, it is left to management information systems to decide the best link for their company's needs. To date, the decision has not been an easy one. For four types of personal computer-to-mainframe products, the following three types of interfaces are currently being used: internal expansion boards, protocol converters and conversion software on the mainframe that allows asynchronous communications products to operate in a full-screen mode as though they were 3270 devices.

The internal expansion boards are the most costly per user and provide the best functionality. They turn the personal computer into a close emulation of several models of 3270 terminals. This emulation combined with the storage capability and programmability of the personal computer allow vendors to implement significant file transfer and file conversion capabilities.

Protocol converters reduce the price per user, but also reduce functionality provided to the user. Some of the storage and programmable features of the personal computer are lost with these external devices because asynchronous communications software is generally required to interface the personal computer to the protocol converter. Some of the transfer and conversion features can be recaptured by programmability and storage capabilities in the protocol converter.

Mainframe software that will allow asynchronous users to access mainframe applications in a full-screen mode is the least expensive and least functional of the three links. All storage and programmability aspects of the personal computer are removed because control is placed on the mainframe.

The four types of personal computer-to-mainframe products now available are simple terminal emulators, terminal emulators with file transfer capabilities, terminal emulators with file transfer and file conversion capabilities and mainframe-dependent applications. The first three types of products — versions of terminal emulators — are used by the mainframe-dependent applications as links between the personal computer and the mainframe.

Simple terminal emulators are becoming a dying breed. Some of the protocol converters and protocol conversion software can still provide this limited functionality, but expansion boards have been enhanced beyond simple terminal emulation. The expansion boards perform most of the file transfer and file conversion capabilities, but some protocol converters can perform simple file transfers.

Mainframe dependent applications fall into two areas: those that closely integrate the personal computer with specific mainframe applications and those that integrate the personal computer into the mainframe environment in a more general way. These products cost much more than the other types of personal computer-to-mainframe products, do not always provide more functionality and require some type of terminal emulator for the link between the personal computer and the mainframe. The high cost results from extensive mainframe software development necessary to allow the personal computer to access the mainframe application easily. Some of the products are restricted to specific mainframe applications and limit overall functionality. The requirement for some additional hardware and software to provide the physical link between the personal computer and the mainframe can add significant cost and complicating factors to the installation of the mainframe dependent application.

Before selecting any micro-to-mainframe link, MIS should consider the following five areas that are critical for most personal computer-to-mainframe users: functionality, ease of use, user interface, documentation and support.

Functionality should always be considered because users may wind up committing large amounts of money to buy personal computer-to-mainframe products that do not work or do not fulfill all of the end user's needs. There are many different features provided by products, and not all of them are provided in any one product. In fact, you will probably never see the ideal product for all users. However, useless functionality in personal computer-to-mainframe products can be a waste of money.

Ease of use is a second aspect to be considered. The easier a product is to understand and use, the greater the acceptance in the organization and the closer it will come to providing for the wants and needs of many users. Some of the newer, more capable products are providing easy-to-use features, but at the same time need someone who is technically oriented to install and configure these features. Users should take care not to get involved with an easy-to-use product that cannot be supported internally.

User interface (closely allied with ease of use) is a third consideration. End users who are not familiar with the complexities of 3270 terminals need a simple, familiar interface. At the same time, experienced users need the ability to get good feedback on operation and solid clues to the causes of problems. A poor user interface can confuse and frustrate inexperienced users and impact productivity.

Documentation is another consideration. New and inexperienced users will shun a product they are unfamiliar with if documentation is difficult to use, incomplete or incomprehensible. Critical areas in documentation include illustrations, glossaries and indexes. Experienced users can become frustrated with documentation that does not contain technical information, details of operation and clues to the inner workings of the hardware and software involved with the product.

Most important and least considered is the issue of support. Not enough buyers consider problems and potential disasters when looking at personal computer-to-mainframe products. What do you do when the chief financial officer cannot get to financial information on the mainframe and the vendor's only support person is out with the flu? How you will be supported is a difficult matter to consider when buying a product like this, but it can become a critical matter at the worst time.

We are starting to see some innovations in personal computer-to-mainframe products. In the future, we will find products that provide a great deal of flexibility while being easy to use, products that make the actual link between the personal computer and the mainframe transparent and allow any link on the market to be used with no obvious indications or concerns on the part of the user, products that allow access to any personal computer or mainframe application and products that blur the distinction between the personal computer and the mainframe by placing resources on each system at the disposal of the other system.

Some of these features are now available. We have recently seen a few products that have provided or implemented virtual disks, easy-to-use menu structures and can accommodate many different personal computer-to-mainframe links. All of these products have a common quality of insulating the end user from the complexity and confusion of personal computer-to-mainframe communications.

Micro Tempus, Inc. was one of the first vendors to introduce a product that simplified the user's task in interfacing to a mainframe. The Tempus-Link product provides virtual disk capabilities that insulate the user from the mainframe environment. All the end user sees is additional disk drives that can be used in the same manner as the local disk drives on the personal computer. Application program interfaces are also provided that allow mainframe applications to access the personal computer's virtual disks. In addition, Micro Tempus has adapted personal computer-to-mainframe links for their product.

Comshare, Inc. recently released W/Information Gateway, a product that provides comprehensive easy-to-use menus, access to mainframe data bases and very good graphics handling capabilities. Experienced users have a great deal of flexibility in setting up the menus, and less experienced users can have those menus customized to their wants and needs. The inexperienced user can also take advantage of the powerful applications and graphics capabilities on the mainframe without experiencing the mainframe's complex environments.

One of the most advanced products is On-Line Software International, Inc.'s Omnilink. This vendor has recently implemented virtual disks, comprehensive menus and interfaces to many different personal computer-to-mainframe links. These were significant enhancements to an earlier version of the product, and the vendor has now placed itself at the forefront of providing the personal computer-to-mainframe product of the future.

There are distinct differences between these products as there are between any personal computer-to-mainframe products. And the aspects mentioned above must be carefully considered as well as the cost when determining what product to buy.

One of the reasons the marketplace in personal computer-to-mainframe communications is so confusing is that so many companies have started up and are then competing for a finite market of business personal computers. It will always remain that way because personal computer-to-mainframe products are not eliminated by significant enhancements in this market. Instead, they are absorbed and integrated into those greatly enhanced products.

The vendors in this area are not trying to change the way IBM does 3270 networks. They are trying to work around the complexities of 3270 to enhance and simplify the way personal computer users can become part of those networks. These efforts started out with simple terminal emulation and grew into complex, comprehensive products.

As personal computer-to-mainframe products become more complex and easier to use, the confusion will shift from what type of product to buy to what product does the best job for the money. Vendors will start to copy the best features of every other vendor's products, and the best selling products will start to closely resemble each other.

The path to the future lies in leaving the complex issues under control of MIS who have the technical expertise to handle them and presenting a simple transparent interface to the end users. A few vendors are taking steps in this direction. And rather than competition making products more complicated and confusing, it is making products simpler and easier for the large number of end users who need access to the vast resources of the mainframe.

Teets is a senior editor and analyst with Data Decisions, located in Cherry Hill, N.J. The information in this article is part of PC Communications, *a 3-volume monthly updated information service.*

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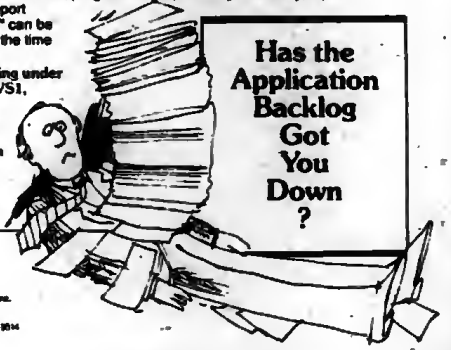

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Products

AT&T's Personal Computer 6300 Plus

MORRISTOWN, N.J. — **AT&T Information Systems** recently announced its Personal Computer 6300 Plus and an option board for its Unix PC called DOS-73. According to AT&T, these products will enable its personal computer users to run applications written for MS-DOS and Unix simultaneously, using a concurrent operating system. The operating system, developed for AT&T by Locus Computing Corp. of Santa Monica, Calif., is called OS Merge, and MS-DOS runs as a Unix task with it. In addition, the company announced an upgrade package to convert its 6300 to the 6300 Plus.

Personal Computer 6300 Plus is a 16-bit microcomputer with an Intel Corp. 80286 processor and an optional 80287 math coprocessor. It operates with a 6-MHz clock speed and zero wait states. Main memory for Personal Computer Plus is 512K bytes on the motherboard, upgradable to 1M byte. The computer will support three additional 2M-byte expansion boards for a total of 7M bytes of memory. The floppy disk unit consists of 512K bytes random-access memory, a 1.2M-byte floppy drive and a 360K-byte floppy drive. The hard disk unit replaces the 360K-byte drive with a 20M-byte half-height internal hard disk.

The basic Personal Computer 6300 Plus machine with MS-DOS capability is available immediately. The OS Merge with Unix option will be available in the first quarter 1986. The AT&T Personal Computer 6300 Plus floppy drive unit costs $5,095; the hard drive system costs $6,320. Both systems include keyboard and monochrome monitor. The OS Merge with Unix option costs $395. The DOS-73 board for the Unix PC sells for $995. The upgrade package to convert the Personal Computer 6300 to a Personal Computer 6300 Plus will be available in December for $2,995.

Contact AT&T Information Systems, Room 2D10, 100 Southgate Parkway, Morristown, N.J. 07960.

MARBLEHEAD, Mass. — **Matrix Communications, Inc.** recently unveiled a computer interconnect system that links up to 20 IBM Personal Computers to share peripherals such as printers, modems or disks at an average cost per workstation attachment of $100.

The Alliance series is based on a programmable intelligent cluster controller that connects PCs via RS-232 interfaces at 115K bit/sec and supports from two to 20 IBM or IBM PC-compatible microcomputers and related peripherals in various star configurations. The cluster controller incorporates a multiplex network managed by a Hitachi, Ltd. 64180 microprocessor, using Matrix Communications proprietary software resident in the cluster controller and the user's personal computer. An optional 480K-byte buffer is available for the cluster controller to perform print spooling and electronic mail functions. Because the Alliance currently operates at 115K bit/sec, most business files can be transferred in approximately 10 to 15 sec, according to the vendor.

In addition to the system software that resides in the cluster controller, the Alliance system includes a utility program for administering the network and an interface package that allows each microcomputer to access the network. Installation of the system takes about half an hour, said the vendor, and Matrix Communications also offers a proprietary serial-to-parallel converter to link a parallel device with an asynchronous port.

Scheduled shipments will begin in January 1986. The 8-port model is priced at $895, with a $349 charge for each additional 4-port module. Contact Matrix Communications, Inc., 112-116 Washington St., Marblehead, Mass. 01945.

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Every week, 35,000 MIS/DP executives read *Computerworld Italia*. Modeled after *Computerworld*, its sister publication in the United States, *Computerworld Italia* covers the latest developments in hardware, software, terminals and supply products.

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Products

RYE BROOK, N.Y. — **IBM** has introduced Pageprinter, capable of providing letter-quality printing and high-resolution graphics for sharing by IBM Personal Computer users, including those on IBM local-area nets. The table-top unit produces text and graphics with a resolution of 240 by 240 pixels by electrophotography, a print technology using photoconductors, toner and a print head containing gallium arsenide phosphide, light-emitting diodes and no moving parts. Pageprinter prints at speeds up to 12 pages/min on 8½- by 11-in. cut-sheet paper and up to 9.6 pages/min on 8.4- by 14-in. legal-size paper. According to the vendor, the duty cycle for Pageprinter is up to 18,000 copies/month.

PC users can select from 61 standard type fonts stored on a diskette in the Pageprinter; System/36 and System/38 users can choose from 54 stored fonts. In addition, when Pageprinter is attached to a large IBM processor using the VM operating system, users can select from a store of 67 standard fonts or 148 optional typographic and mathematical fonts. The unit has two paper cassettes — one holds up to 550 sheets and one holds up to 250 sheets. Finished jobs are automatically delivered to the output tray face down in sequential order.

Pageprinter can be attached to as many as eight PCs. Many more PC users on the IBM Token-Ring or PC networks can share the printer by directly attaching it to a print server PC containing PC Network programs. The printer can serve as a text-only unit for the System/38 and System/36 5360 and 5362 models and can be used as a full-function text and graphics printer when attached to IBM System/370 models 138 through 168, 4300, 3030, 3080 and 3090 series processors under the VM operating system. Pageprinter has a purchase price of $7,490 and will be available in November for PC and VM systems and in February 1986 for System/36 and System/38 systems. Contact IBM Information Systems Group, 900 King St., Rye Brook, N.Y. 10573.

SANTA CRUZ, Calif. — **The Santa Cruz Operation, Inc.** introduced its Microsoft Corp.'s Xenix System V operating system on an AT&T Personal Computer 6300. According to the vendor, Xenix V is the first version of Unix developed outside of AT&T to be verified as System V by AT&T's software verification standards. Xenix applications are binary compatible with both Santa Cruz Operation's IBM Personal Computer XT- and AT-

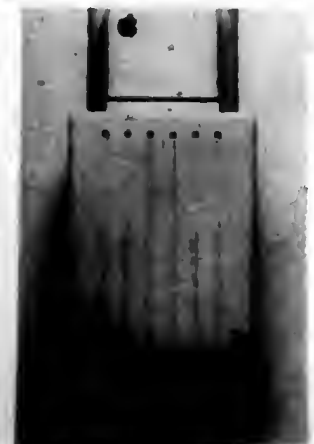
Apple Computer, Inc.'s Hard Disk 20

CUPERTINO, Calif. — **Apple Computer, Inc.** has announced a number of new products to enhance its Macintosh and Apple II lines.

Among the new products for the Macintosh are a 20M-byte hard disk for Macintosh 512K users; Switcher, a software utility that allows users to work with several programs at once; Imagewriter II, a dot-matrix printer with an optional 100-sheet sheet feeder; and Apple Personal Modem, a Hayes Microcomputer Products, Inc.-compatible 300/1,200 bit/sec modem.

For the Apple II, the company announced Unidisk 3.5, a 3½-in. floppy disk drive that can store up to 800K bytes of information, more than five times the capacity of Apple's current 5¼-in. drives.

The 20M-byte hard disk drive for the Macintosh costs $1,499; Switcher is available for a yearly license fee to software developers of $250 per application; Imagewriter II sells for $595 (plus $225 for the sheet feeder); and the Apple Personal Modem costs $399. Unidisk 3.5 for the Apple II series of microcomputers is $499. For more information, contact Apple Computer, Inc., 20525 Mariani Ave., Cupertino, Calif. 95014.



Apple Computer's Personal Modem

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compatible versions of Xenix System V. In addition, applications developed for IBM's current PC AT Xenix 1.0, which is based on System III, will run unchanged on SCO's Intel Corp. 80286-based Xenix System V. The vendor also said that utilities that are part of the Xenix system are binary-identical in both its Intel 8088/86-based Xenix System V and its Intel 80286-based Xenix System V products.

Xenix System V is available in three modules: the operating system, $495, the development system, $495, and the text processing system, $295. All three modules may be purchased bundled together for $995. Contact The Santa Cruz Operation, P.O. Box 1900, 500 Chestnut St., Santa Cruz, Calif. 95061.

HP's Vectra personal computer

PALO ALTO, Calif. — **Hewlett-Packard Co.** has announced the Vectra Personal Computer, a modular desktop unit offering IBM Personal Computer AT compatibility.

Based on the Intel Corp. 80286, 16-bit microprocessor, the Vectra Personal Computer features a modular design that is 30% smaller than the IBM Personal Computer AT.

In addition to being able to run the same applications and use the same accessory cards as the IBM Personal Computer AT, the Vectra Personal Computer operates at 8 MHz, allowing program execution up to 30% faster than the IBM Personal Computer AT, according to the vendor.

The Vectra also offers high-resolution monochrome or color displays, providing a full-display resolution of 640 by 400 pixels.

In addition to HP Touch, the optional HP touchscreen facility, the Vectra Personal Computer also supports a wide range of input devices through the HP Human Interface Loop, including a mouse, graphics tablet and bar-code readers.

The Vectra will run many of Hewlett-Packard Co.'s proprietary software programs including Executive Card Manager, Executive Spreadsheet and the new Advancewrite word processing program.

Vectra's entry-level system, priced at $3,199, has 256K bytes of random-access memory (RAM) and one 360K-byte 5¼-in. disk drive.

For more information, contact Hewlett-Packard Co., 3000 Hanover St., Palo Alto, Calif. 94304.

MINNEAPOLIS — Lanmaster, a modular networking system designed to link together personal computers while allowing users of different local-area networks to share files and other resources, was recently announced by **Lee Data Corp.**

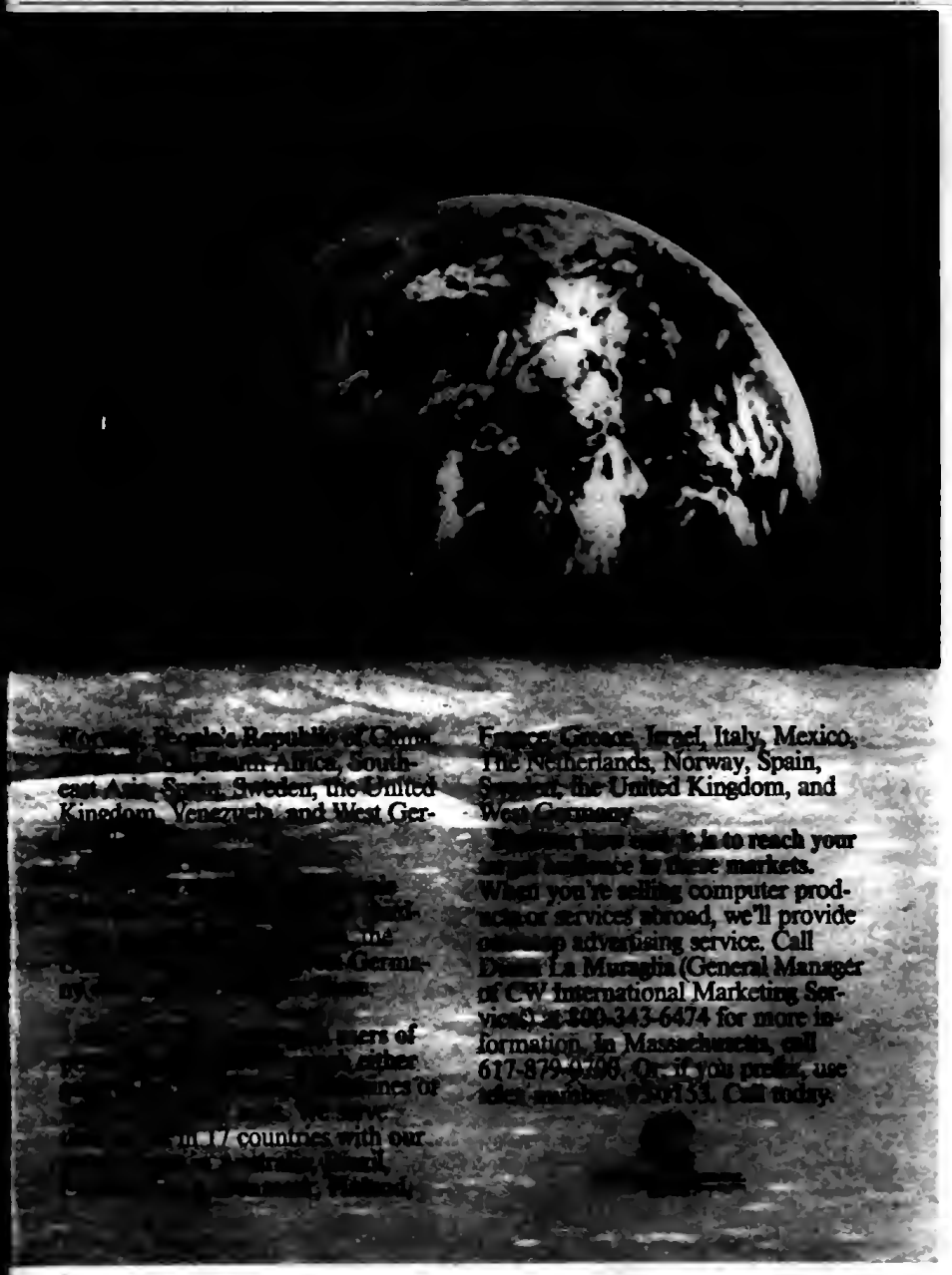
According to the vendor, Lanmaster also provides asynchronous dial-in capabilities to remote personal computers, allowing single users in remote locations to access the entire system. In addition, the system provides access to IBM and non-IBM mainframe computers by direct local connection or through public data networks.

Users may choose from a menu of services including file access, printer use, tape backup, time and date and electronic mail. Lanmaster also provides a system administration service to permit or restrict access to data file, networks or mainframes.

The basic Model 824 sells for $13,900 and consists of 1M byte of random-access memory (RAM), a 43M-byte fixed disk, two serial and two parallel ports, network control software, battery backup and 45M- to 60M-byte cartridge tape backup. Model 827, with a 70M-byte hard disk, is available for $15,600. Unit shipments will begin in November.

For more information, contact Lee Data Corp., 7075 Flying Cloud Drive, Minneapolis, Minn. 55344.

Lee Data Corp.'s Lanmaster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November 18-20, Boston — **Optimizing Software Productivity and Quality.** Also, February 19-21, Los Angeles. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

November 25, New York — **Business Intelligence Information.** Also, December 6, Boston. Contact: Seminar Office, Worcester Polytechnic Institute, Worcester, Mass. 01609.

December 2-4, San Francisco — **Protocols for Message Handling Systems.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

December 2-4, Washington, D.C. — **Network Protocols and Standards.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

December 2-4, New York — **Networking Personal Computers.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 2201S.

December 4-5, Los Angeles — **Office Automation Design and Management.** Also, December 11-12, Philadelphia; February 5-6, Miami; and March 19-20, San Francisco. Contact: Thomas Wilds Associates, Inc., P.O. Box 11120, Greenwich, Conn. 06830.

December 4-6, Washington, D.C. — **Introduction to Data Communications.** Also, December 11-13, New York; December 11-13, Fort Lauderdale, Fla.; and December 16-18, Los Angeles. Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 2201S.

December 9-10, New York — **Managers' Update.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 2201S.

December 9-11, San Francisco — **PCs: A Corporate Information Strategy.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

December 9-11, Chicago — **Long-Range Planning and Strategic Facility Management.** Also, January 13-1S, Dallas. Contact: Facility Management Institute, 3971 S. Research Park Drive, Ann Arbor, Mich. 48104.

December 10, New York — **The Software Revolution — Large Systems Development.** Also, December 11, Washington, D.C. Contact: International Data Corp., S Speen St., Framingham, Mass. 01701.

December 10-12, Philadelphia — **Advanced Program to the 1985 Videodisc, Optical Disk and CD-ROM Conference and Exposition.** Contact: Meckler Publishing, 11 Ferry Lane W., Westport, Conn. 06880.

December 11-13, Washington, D.C. — **TI Networking.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 2201S.

January 1S, New York — **Executive Strategies for the Information Age.** Also, March 26, Dallas. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

January 27-30, Washington, D.C. — **The Eighth Annual Communication Networks Conference and Exposition.** Contact: Communication Networks, Box 880, Framingham, Mass. 01701.

December 5-6, Boston — **Local-Area Networks.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

December 5-6, San Francisco — **Integrating Voice and Data in the PBX.** Also, December 12-13, New York. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

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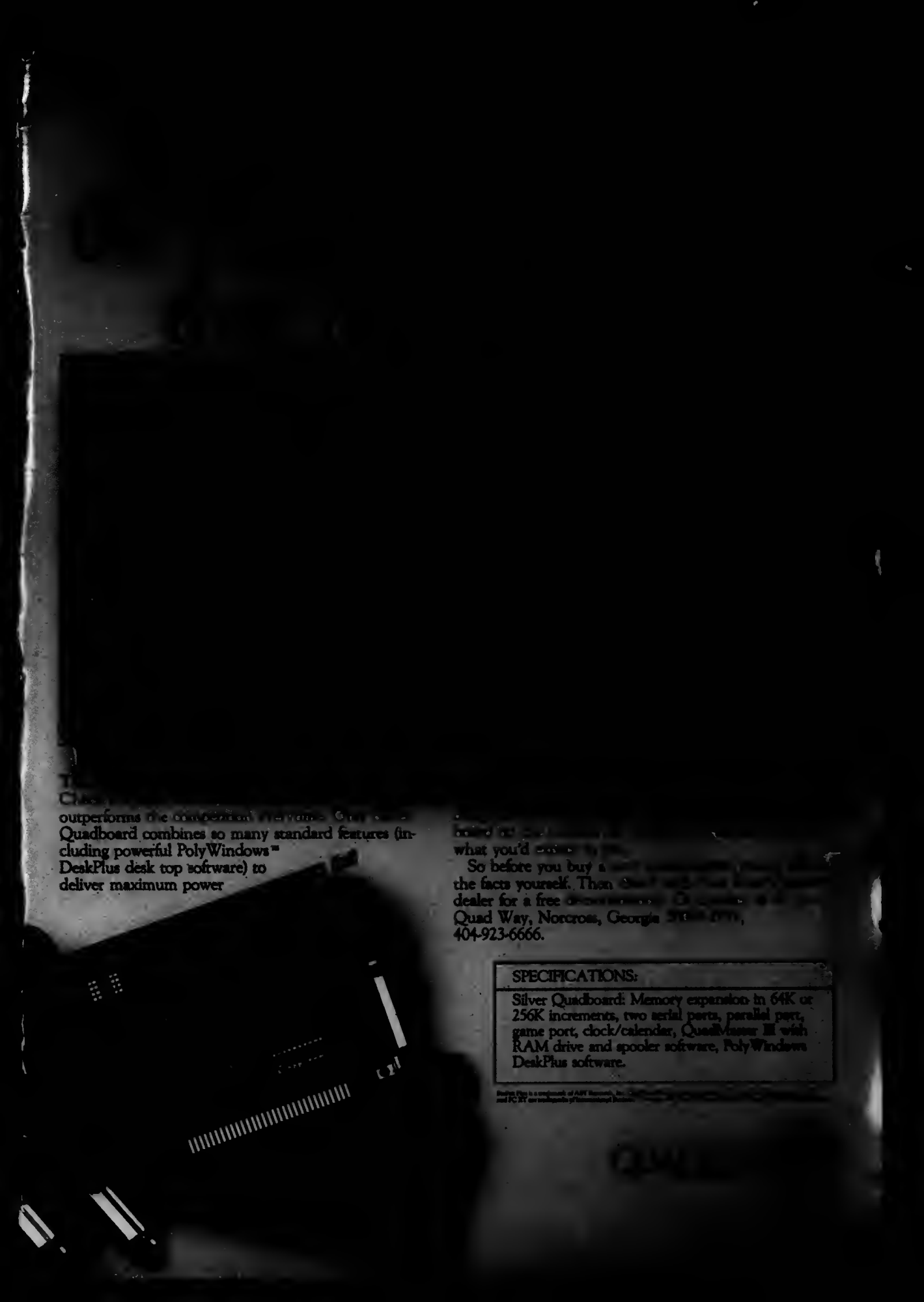

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